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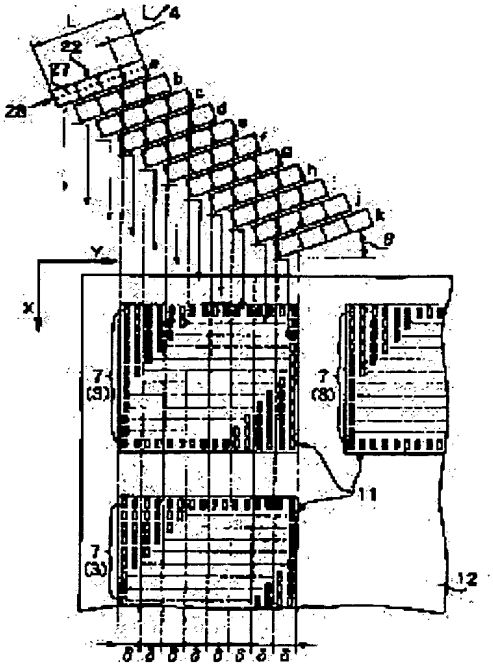
(54) EJECTION METHOD AND ITS APPARATUS, ELECTRO-OPTIC DEVICE, METHOD AND APPARATUS FOR MANUFACTURING THE DEVICE, COLOR FILTER, METHOD AND APPARATUS FOR MANUFACTURING THE FILTER, DEVICE WITH SUBSTRATE, AND METHOD AND APPARATUS FOR MANUFACTURING THE DEVICE

(57)Abstract:
PROBLEM TO BE SOLVED: To provide an ejection apparatus capable of flatly uniformalzing electro-optic properties of electro-optic members such as optical permeability of a color filter, color display properties of a liquid crystal device and light emission properties on the EL light emission surface.
SOLUTION: Ink jet heads 22 each constituting a nozzle array 28 with a plurality of nozzles 27 set in an array are aligned in straight line and disposed in the liquid drop ejection apparatus for manufacturing the color filter 1. A filter element material is ejected four times repeatedly by means of the plurality of nozzles 27 from the nozzles 27 other than the ones at opposite ends in the arranging direction, which eject ten percent more than the average ejection amount, to a mother substrate 12 to form one filter element 3 with a predetermined thickness. Fluctuations in thickness among a plurality of filter elements can be prevented and the light permeability of the color filter 1 can be flatly uniformalized.



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CLAIMS

[Claim(s)]
[Claim 1] Regurgitation equipment which is characterized by providing the following and by which it was characterized Two or more drop discharge heads prepared so that two or more nozzles which carry out the regurgitation of the liquefied object with a fluidity on discharged substance-ed might arrange A maintenance means to make the whole surface in which said nozzle of this drop discharge head was prepared counter the front face of said discharged substance-ed through a gap, and to arrange said drop discharge head [two or more] in the predetermined direction The migration means to which said drop discharge head moves either relatively at least in the condition of this maintenance means and said discharged substance-ed of meeting the front face of said discharged substance-ed It is a regurgitation regulation means by which said liquefied object is not made to breathe out from the nozzle located in the predetermined field of the both ends of the arrangement direction of the nozzle of two or more of said drop discharge heads.
[Claim 2] The field of the nozzle which does not carry out the regurgitation of the liquefied object with a regurgitation regulation means in regurgitation equipment according to claim 1 is regurgitation equipment characterized by being the field of the nozzle which serves as many [ten percent or more] discharge quantity from the average of the discharge quantity of said liquefied object breathed out from each nozzle.
[Claim 3] The discharge quantity breathed out from each nozzle in regurgitation equipment according to claim 1 is regurgitation equipment characterized by being less than **ten percent to the average of the discharge quantity of each nozzle.
[Claim 4] A drop discharge head is regurgitation equipment characterized by preparing a nozzle at intervals of abbreviation etc. in regurgitation equipment according to claim 1 to 3.
[Claim 5] Two or more drop discharge heads are regurgitation equipment characterized by for the arrangement direction of a nozzle having crossed aslant in regurgitation equipment according to claim 1 to 4 to the direction to which this drop discharge head is relatively moved along the front face of discharged substance-ed, and having arranged it by the migration means.
[Claim 6] It is regurgitation equipment characterized by two or more drop discharge heads having the nozzle of the same number in regurgitation equipment according to claim 1 to 5.
[Claim 7] In regurgitation equipment according to claim 1 to 6 two or more drop discharge heads The field of a nozzle where the edge field of the nozzle which does not carry out the regurgitation of the liquefied object carries out the regurgitation of the liquefied object of an adjoining drop discharge head, Regurgitation equipment with which it overlapped to said direction which moves relatively, and the nozzle which is arranged so that it may be located, and carries out the regurgitation of the liquefied object was characterized by making it arrange continuously in two or more whole drop discharge heads.
[Claim 8] In regurgitation equipment according to claim 1 to 7 two or more drop discharge heads Regurgitation equipment characterized by having been arranged so that the nozzle field where the edge field of the nozzle which arranges in two or more trains, and is arranged, and does not carry out the regurgitation of the liquefied object carries out the regurgitation of the liquefied object of the drop discharge head arranged at other trains of the two or more trains may be

overlapped to said direction which moves relatively and it may be located.
[Claim 9] In the manufacturing installation of an electro-optic device equipped with regurgitation equipment according to claim 1 to 8 Discharged substance-ed being a substrate with which EL luminous layer is formed, and moving two or more drop discharge heads relatively to said substrate The manufacturing installation of the electro-optic device characterized by making the liquefied object which contains EL luminescent material from the predetermined nozzle in said two or more drop discharge heads breathe out, and forming EL luminous layer on said substrate on said substrate.
[Claim 10] being the manufacturing installation of an electro-optic device equipped with regurgitation equipment according to claim 1 to 8, and the substrate of the pair which pinches liquid crystal coming out on the other hand, and there being discharged substance-ed, and moving two or more drop discharge heads relatively to said substrate The manufacturing installation of the electro-optic device characterized by making the liquefied object which contains a color filter ingredient from the predetermined nozzle in said two or more drop discharge heads breathe out, and forming a color filter on said substrate on said substrate.
[Claim 11] It is the manufacturing installation of a color filter equipped with regurgitation equipment according to claim 1 to 8. Discharged substance-ed being a substrate with which the color filter which presents a different color is formed, and moving two or more drop discharge heads relatively to said substrate The manufacturing installation of the color filter characterized by making the liquefied object which contains a color filter ingredient from the predetermined nozzle in said two or more drop discharge heads breathe out, and forming a color filter on said substrate on said substrate.
[Claim 12] It is the electro-optic device characterized by providing the following. Said EL luminous layer Two or more drop discharge heads which two or more nozzles which carry out the regurgitation of the liquefied object containing EL luminescent material arranged, were prepared, and have been put in order and arranged in the predetermined direction It is made not to make said liquefied object breathe out from the nozzle located in the predetermined field of the both ends of the arrangement direction of said nozzle. The electro-optic device characterized by for said liquefied object having been suitably breathed out by the position on said substrate, and forming it in it from said nozzle, moving relatively the whole surface which has said nozzle in the condition of countering the front face of said substrate through a gap The substrate with which two or more electrodes were prepared EL luminous layer prepared on this substrate corresponding to said electrode [two or more]
[Claim 13] It is the electro-optic device characterized by providing the following. Said color filter Two or more drop discharge heads which two or more nozzles which carry out the regurgitation of the liquefied object containing the filter material of a predetermined color arranged, were prepared, and have been put in order and arranged in the predetermined direction It is made not to make said liquefied object breathe out from the nozzle located in the predetermined field of the both ends of the arrangement direction of said nozzle. The electro-optic device characterized by for said liquefied object having been suitably breathed out by the position on said substrate, and forming it in it from said nozzle, moving relatively the whole surface which has said nozzle in the condition of countering the front face of said substrate through a gap Substrate The color filter of a different color formed on this substrate
[Claim 14] It is the color filter formed so that a different color on a substrate might be presented. Two or more drop discharge heads which two or more nozzles which carry out the regurgitation of the liquefied object containing the filter material of a predetermined color arranged, were prepared, and have been put in order and arranged in the predetermined direction It is made not to make said liquefied object breathe out from the nozzle located in the predetermined field of the both ends of the arrangement direction of said nozzle. The color filter characterized by for said liquefied object having been suitably breathed out by the position on said substrate, and forming it in it from said nozzle, moving relatively the whole surface which has said nozzle in the condition of countering the front face of said substrate through a gap.
[Claim 15] Two or more drop discharge heads which two or more nozzles which carry out the regurgitation of the liquefied object with a fluidity arranged, were prepared, and have been put in

order and arranged in the predetermined direction It is made not to make said liquefied object breathe out from the nozzle located in the predetermined field of the both ends of the arrangement direction of said nozzle. The regurgitation approach characterized by carrying out the regurgitation of said liquefied object on said discharged substance-ed from a predetermined nozzle, moving relatively the whole surface which has said nozzle in the condition of countering the front face of said discharged substance-ed through a gap.
[Claim 16] The nozzle of the predetermined field located in the both ends of the arrangement direction of a nozzle in the regurgitation approach according to claim 15 is the regurgitation approach characterized by being the nozzle of the field which serves as many [ten percent or more] discharge quantity from the average of the discharge quantity of said liquefied object breathed out from said each nozzle.
[Claim 17] The discharge quantity breathed out from each nozzle in the regurgitation approach according to claim 15 is the regurgitation approach characterized by being less than **ten percent to the average of the discharge quantity of each of said nozzle.
[Claim 18] A drop discharge head is the regurgitation approach characterized by preparing a nozzle at intervals of abbreviation etc. in the regurgitation approach according to claim 15 to 17, and carrying out the regurgitation of the liquefied object on discharged substance-ed from the nozzle of this drop discharge head.
[Claim 19] The regurgitation approach that two or more drop discharge heads are characterized by carrying out the regurgitation of the liquefied object on discharged substance-ed from the nozzle of this drop discharge head in the regurgitation approach according to claim 15 to 18 in the condition of having been arranged so that the arrangement direction of a nozzle may cross aslant to the direction to which this drop discharge head is relatively moved along the front face of discharged substance-ed.
[Claim 20] It is the regurgitation approach characterized by for two or more drop discharge heads having the nozzle of the same number in the regurgitation approach according to claim 15 to 19, and carrying out the regurgitation of the liquefied object on discharged substance-ed from the nozzle of these drop discharge head.
[Claim 21] In the regurgitation approach according to claim 15 to 20 two or more drop discharge heads The field of a nozzle where the edge field of the nozzle which does not carry out the regurgitation of the liquefied object carries out the regurgitation of the liquefied object of an adjoining drop discharge head, The regurgitation approach which overlaps to said direction which moves relatively and is characterized by being located, being arranged so that the nozzle which carries out the regurgitation of the liquefied object may arrange continuously in two or more whole drop discharge heads, and carrying out the regurgitation of the liquefied object on discharged substance-ed from the nozzle of these drop discharge head.
[Claim 22] In the regurgitation approach according to claim 15 to 21 two or more drop discharge heads The nozzle field which carries out the regurgitation of the liquefied object of the drop discharge head which arranges in two or more trains, is arranged, and is arranged in the edge field of the nozzle which does not carry out the regurgitation of the liquefied object at other trains of the two or more trains, The regurgitation approach which overlaps to said direction which moves relatively and is characterized by being arranged so that it may be located, and carrying out the regurgitation of the liquefied object on discharged substance-ed from the nozzle of these drop discharge head.
[Claim 23] It is the manufacture approach of the electro-optic device which it is the manufacture approach of the electro-optic device which carries out the regurgitation of the liquefied object by the regurgitation approach according to claim 15 to 22, and said liquefied object contains EL luminescent material, and is characterized by carrying out the regurgitation of said liquefied object to the position on said substrate suitably from said nozzle, and forming EL luminous layer, discharged substance-ed being a substrate and moving a drop discharge head relatively in the condition of meeting the front face of said substrate.
[Claim 24] It is the manufacture approach of the electro-optic device which it is the manufacture approach of the electro-optic device which carries out the regurgitation of the liquefied object by the regurgitation approach according to claim 15 to 22, and said liquefied

object contains a color filter ingredient, and is characterized by carrying out the regurgitation of said liquefied object to the position on said substrate suitably from said nozzle, and forming a color filter, discharged substance-ed being a substrate and moving a drop discharge head relatively in the condition of meeting the front face of said substrate.
[Claim 25] It is the manufacture approach of the color filter which it is the manufacture approach of the color filter which carries out the regurgitation of the liquefied object by the regurgitation approach according to claim 15 to 22, and said liquefied object contains a filter material, and is characterized by carrying out the regurgitation of said liquefied object to the position on said substrate suitably from said nozzle, and forming a color filter, discharged substance-ed being a substrate and moving a drop discharge head relatively in the condition of meeting the front face of said substrate.
[Claim 26] The substrate with which two or more electrodes were prepared EL luminous layer prepared on this substrate corresponding to said electrode [two or more] Two or more drop discharge heads which were the manufacture approaches of the electro-optic device equipped with the above, and two or more nozzles which carry out the regurgitation of the liquefied object containing EL luminescent material arranged, were prepared, and have been put in order and arranged in the predetermined direction It is made not to make said liquefied object breathe out from the nozzle located in the predetermined field of the both ends of the arrangement direction of said nozzle. It is characterized by carrying out the regurgitation of said liquefied object to the position on said substrate suitably from said nozzle, and forming said EL luminous layer, moving relatively the whole surface which has said nozzle in the condition of countering the front face of said substrate through a gap.
[Claim 27] Substrate The color filter of a different color formed on this substrate Two or more drop discharge heads which were the manufacture approaches of the electro-optic device equipped with the above, and two or more nozzles which carry out the regurgitation of the liquefied object containing the filter material of a predetermined color arranged, were prepared, and have been put in order and arranged in the predetermined direction It is made not to make said liquefied object breathe out from the nozzle located in the predetermined field of the both ends of the arrangement direction of said nozzle. It is characterized by carrying out the regurgitation of said liquefied object to the position on said substrate suitably from said nozzle, and forming said color filter, moving relatively the whole surface which has said nozzle in the condition of countering the front face of said substrate through a gap.
[Claim 28] It is the manufacture approach of a color filter of manufacturing the color filter formed so that a different color on a substrate might be presented. Two or more drop discharge heads which two or more nozzles which carry out the regurgitation of the liquefied object containing the filter material of a predetermined color arranged, were prepared, and have been put in order and arranged in the predetermined direction It is made not to make said liquefied object breathe out from the nozzle located in the predetermined field of the both ends of the arrangement direction of said nozzle. The manufacture approach of the color filter characterized by carrying out the regurgitation of said liquefied object to the position on said substrate suitably from said nozzle, and forming said color filter, moving relatively the whole surface which has said nozzle in the condition of countering the front face of said substrate through a gap.
[Claim 29] It is the device which is characterized by providing the following and which has the base material with which the liquefied object was breathed out and formed. Two or more nozzles which carry out the regurgitation of said liquefied object arrange, and are prepared, and it is made for two or more drop discharge heads put in order and arranged in the predetermined direction not to make said liquefied object breathe out from the nozzle located in the predetermined field of the both ends of the arrangement direction of said nozzle. The device which has the base material characterized by for said liquefied object having been suitably breathed out from the predetermined nozzle by the position on said base material, and forming a predetermined layer, moving relatively the whole surface which has said nozzle in the condition of countering the front face of said base material through a gap Base material It is a fluidity on this base material.
[Claim 30] It is the manufacturing installation of a device which has the base material

characterized by having regurgitation equipment according to claim 1 to 8, breathing out a liquefied object on said base material from said two or more drop discharge heads in the process which discharged substance-ed is the base material of a device, and forms a predetermined layer on said base material, and forming a predetermined layer.
[Claim 31] The manufacture approach of a device of having the base material characterized by breathing out a liquefied object and forming a predetermined layer on said base material by the regurgitation approach according to claim 15 to 22 on the base material which is discharged substance-ed.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the regurgitation approach which carries out the regurgitation of the liquefied object with a fluidity, and its equipment. And this invention relates to the manufacture approach of electro-optic devices, such as liquid crystal equipment, EL equipment, an electrophoresis apparatus, electron emission equipment, and PDP equipment, and electro-optics ****** which manufactures this electro-optic device, and its manufacturing installation. Moreover, this invention relates to the color filter used for an electro-optic device, the manufacture approach of manufacturing this color filter, and its manufacturing installation. Furthermore, this invention relates to the manufacture approach of manufacturing the device which has base materials, such as an electro-optics member, a semiconductor device, an optical member, and reagent Banking Inspection Department material, and a device with this base material, and its manufacturing installation.
[0002]
[Background of the Invention] In recent years, the display which are electro-optic devices, such as liquid crystal equipment and electroluminescence equipment (henceforth EL (electoroluminescence) equipment), is widely used for the display of electronic equipment, such as a portable telephone and a pocket mold computer. Moreover, recently, it indicates by full color more often with the display. The full color display by this liquid crystal equipment is displayed by letting the light modulated by for example, the liquid crystal layer pass to a color filter. And a color filter is formed in the front face of the substrate formed by glass, plastics, etc. by putting the filter element of each color of the shape of a dot of R (red), G (green), and B (blue) in order in predetermined arrays, such as the so-called stripe array, a delta array, or a mosaic array.
[0003] Moreover, the full color display by EL equipment arranges EL luminous layer of each color of the shape of a dot of R (red), G (green), and B (blue) in the front face of the substrate formed by glass, plastics, etc. in predetermined arrays, such as the so-called stripe array, a delta array, or a mosaic array, pinches these EL luminous layers on it with the electrode of a pair, and forms a picture element pixel in it. And by controlling the electrical potential difference impressed to these electrodes for every picture element pixel, these picture element pixel is made to emit light by the color of hope, and indicates by full color.
[0004] When carrying out patterning of the picture element pixel of each color, such as a case where patterning of the filter element of each color of a color filter, such as R, G, and B, is carried out conventionally, and R, G, B of EL equipment, using the photolithography method is known. However, since it consumes that a process is complicated, an ingredient or a photoresist of each color, etc. so much in using this photolithography method, there is a problem that cost becomes high etc.
[0005] In order to solve this problem, the approach of forming a filament, EL luminous layer, etc. of a dot-like array is proposed by carrying out the regurgitation of a filter-element ingredient, the EL luminescent material, etc. to the shape of a dot by the ink jet method which carries out the regurgitation of the drop.
[0006] Here, how to form a filament, EL luminous layer, etc. of a dot-like array by the ink jet

method is explained. In drawing 50 (a), the case where two or more filter elements 303 arranged in the shape of a dot are formed in the contrant region of the substrate of the large area formed by glass, plastics, etc. and two or more panel fields 302 set as the so-called front face of a mother board 301 based on the ink jet method as shown in drawing 50 (b) is considered. In this case, as shown in drawing 50 (c), for example, the ink jet head 306 which is a drop discharge head which has the nozzle train 305 which arranges two or more nozzles 304 to seriate, and becomes Carrying out multiple-times (drawing 50 2 times) horizontal scanning about one panel field 302, as the arrow head A1 and arrow head A2 of drawing 50 (b) show A filter element 303 is formed in the location of choice by carrying out the regurgitation of ink, i.e., the filter material, alternatively from two or more nozzles among those horizontal scanning.
[0007] This filter element 303 is formed by arranging each color, such as R, G, and B, with proper array gestalten, such as the so-called stripe array, a delta array, and a mosaic array, as mentioned above. From this, only three classification by color of R, G, and B forms beforehand the ink jet head 306 to which the ink regurgitation processing by the ink jet head 306 shown in drawing 50 (b) carries out the regurgitation of the monochrome of R, G, and B. And 3 color arrays, such as R, G, and B, are formed on one mother board 301, using these ink jet heads 306 one by one.
[0008]
[Problem(s) to be Solved by the Invention] By the way, generally about the ink jet head 306, variation is in the ink discharge quantity of two or more nozzles 304 which constitute the nozzle train 305. As shown in drawing 51 (a), this has much discharge quantity of the location corresponding to the both ends of the nozzle train 305, and the degree has many the center sections, and it has the ink regurgitation property Q that little discharge quantity of those pars intermedia is.
[0009] Therefore, as it was shown in drawing 51 (b), when a filter element 303 is formed by the ink jet head 306, as shown in drawing 51 (b), a stripe with deep concentration will be formed in both P1 and P2 [the location P1 corresponding to the edge of the ink jet head 306 a center section P2, or]. For this reason, there is a problem that the superficial light transmission property of a color filter becomes an ununiformity.
[0010] On the other hand, when forming two or more panel fields 302 in a mother board 301, it is possible to form a filter element 303 efficiently by using a straight side-like ink jet head so that an ink jet head may be located throughout the width-of-face dimension abbreviation for the mother board 301 which serves as the cross direction to the main scanning direction of an ink jet head. However, in using the mother board 301 of different magnitude corresponding to the magnitude of the panel field 302, an ink jet head different each time is needed, and there is a problem on which cost increases.
[0011] This invention aims at offering the regurgitation approach which can form the layer from which a uniform property is acquired on discharged substance-ed and its equipment, an electro-optic device, its manufacture approach and its manufacturing installation, a color filter, its manufacture approach, its manufacturing installation and the device that has a base material, its manufacture approach, and its manufacturing installation, though drop discharge heads, such as an ink jet head, are used in view of such a trouble.
[0012]
[Means for Solving the Problem] (1) Two or more drop discharge heads prepared so that two or more nozzles which carry out the regurgitation of the liquefied object with a fluidity on discharged substance-ed might arrange the regurgitation equipment of this invention, A maintenance means to make the whole surface in which said nozzle of this drop discharge head was prepared counter the front face of said discharged substance-ed through a gap, and to arrange said drop discharge head [two or more] in the predetermined direction, The migration means to which said drop discharge head moves either relatively at least in the condition of this maintenance means and said discharged substance-ed of meeting the front face of said discharged substance-ed, It is characterized by providing a regurgitation regulation means by which said liquefied object is not made to breathe out, from the nozzle located in the predetermined field of the both ends of the arrangement direction of the nozzle of two or more

of said drop discharge heads.
[0013] Two or more drop discharge heads prepared so that two or more nozzles which carry out the regurgitation might arrange a liquefied object with a fluidity on the whole surface in this invention It is made to move relatively along the front face of discharged substance-ed in the condition that the whole surface in which the nozzle of these drop discharge head was prepared counters the front face of discharged substance-ed through a predetermined gap. From the nozzle located in the predetermined field of the both ends of the arrangement direction of these nozzles among each nozzle of a drop discharge head, the regurgitation of the liquefied object is carried out to the front face of nozzles other than a predetermined field to discharged substance-ed, without making it breathe out with a regurgitation regulation means. Since a liquefied object is not made to breathe out from the nozzle of the predetermined field located in the both ends of the arrangement direction of a nozzle where especially the discharge quantity of a liquefied object increases but discharge quantity makes a liquefied object breathe out by this configuration using a comparatively uniform nozzle, a liquefied object is superficially breathed out by homogeneity on the front face of discharged substance-ed.
[0014] And as for the field of the nozzle which does not carry out the regurgitation of the liquefied object with a regurgitation regulation means in this invention, it is more desirable than the average of the discharge quantity of said liquefied object breathed out from each nozzle that it is the field of the nozzle used as many [ten percent or more] discharge quantity. By this configuration, even when using the functional liquefied objects for [which contained the filter-element ingredient of a color filter, EL luminescent material, and a charged particle especially since a liquefied object was not made to breathe out from the nozzle which serves as many / ten percent or more / discharge quantity from the average of the discharge quantity of a liquefied object] electrophoresis apparatus as a liquefied object, variation does not arise in a property, but a good property is acquired certainly.
[0015] Moreover, as for the discharge quantity breathed out from each nozzle in this invention, it is desirable that it is less than **ten percent to the average of the discharge quantity of each nozzle. Since a liquefied object is breathed out from each nozzle within **ten percent to the average of discharge quantity by this configuration, discharge quantity becomes comparatively uniform and a liquefied object is superficially breathed out by homogeneity on the front face of discharged substance-ed by it.
[0016] Furthermore, as for a drop discharge head, in this invention, it is desirable that the nozzle was prepared at intervals of abbreviation etc. Since a dot matrix is constituted by moving the drop regurgitation in the direction which crosses, for example to the arrangement direction of a nozzle from nozzles being spacing, such as abbreviation, by this configuration, it becomes easy to draw [of a configuration with predetermined regularity] a stripe mold, mosaicism, a delta mold, etc., for example.
[0017] Moreover, as for two or more drop discharge heads, in this invention, it is desirable for the arrangement direction of a nozzle to have crossed aslant to the direction to which this drop discharge head is relatively moved by the migration means along the front face of discharged substance-ed, and to have been arranged. Since a drop discharge head is relatively moved in the direction which crosses to the arrangement direction of a nozzle according to this configuration The arrangement direction of a nozzle will be in the condition of having inclined to the migration direction, and the pitch which is spacing by which a liquefied object is breathed out becomes narrower than the pitch between nozzles, and the condition of inclining, only by setting up suitably It can respond to the pitch between dots of the request at the time of carrying out the regurgitation of the liquefied object to the shape of a dot on the front face of discharged substance-ed easily, it is not necessary to form a drop discharge head corresponding to the pitch between dots, and versatility improves.
[0018] And as for two or more drop discharge heads, in this invention, it is desirable to have had the nozzle of the same number. It becomes easy [for example, a stripe mold, mosaicism, a delta mold, etc.] to draw a configuration with predetermined regularity as a configuration which arranges two or more drop discharge heads side by side by this configuration since the nozzle of each drop discharge head is made into the same number.

[0019] Moreover, as for two or more drop [this invention] discharge head, it is desirable to have made it the nozzle to which the edge field of the nozzle which does not carry out the regurgitation of the liquefied object is arranged so that the field of the nozzle which carries out the regurgitation of the liquefied object of an adjoining drop discharge head may be overlapped to said direction which moves relatively and it may be located, and it carries out the regurgitation of the liquefied object arrange continuously in two or more whole drop discharge heads. Since it is overlapped and located by this configuration to the direction to which the edge field of the nozzle which does not carry out the regurgitation of the liquefied object moves the liquefied object of an adjoining drop discharge head relatively [field / of the nozzle which carries out the regurgitation] While the nozzle which carries out the regurgitation of the liquefied object in two or more whole drop discharge heads comes to arrange continuously, the array area of a nozzle becomes large, a liquefied object is breathed out by the large range and regurgitation effectiveness improves, it is not necessary to form a straight side-like drop discharge head specially, and versatility improves.
[0020] Furthermore, as for two or more drop [this invention] discharge head, it is desirable that the edge field of the nozzle which arranges in two or more trains, and is arranged, and does not carry out the regurgitation of the liquefied object has been arranged so that the nozzle field which carries out the regurgitation of the liquefied object of the drop discharge head arranged at other trains of the two or more trains may be overlapped to said direction which moves relatively and it may be located. Since you makes it overlapped and located to the direction which moves in the edge field of the nozzle which is put in order by two or more trains in a drop discharge head by this configuration, and does not carry out the regurgitation of the liquefied object relatively [field / which carries out the regurgitation of the liquefied object of the drop discharge head of other trains / nozzle], the field where a liquefied object is not breathed out between drop discharge heads, without an adjacent drop discharge head interfering does not produce, and the good regurgitation of a continuous liquefied object is obtained. Moreover, it is not necessary to form the drop discharge head of the shape of special straight side, and a liquefied object is easily breathed out with an easy configuration.
[0021] (2) It is convenient for making it breathe out on the substrate which is discharged substance-ed, forming EL luminous layer using the liquefied object which contains EL luminescent material in this invention as a liquefied object which carries out the regurgitation, and manufacturing an electro-optic device.
[0022] (3) It is convenient for making one side of the substrate of the pair which pinches liquid crystal as discharged substance-ed breathe out using the liquefied object which contains a color filter ingredient in this invention as a liquefied object which carries out the regurgitation, forming a color filter, and manufacturing an electro-optic device.
[0023] (4) It is convenient for manufacturing the color filter which presents a color which is made to breathe out on the substrate which is discharged substance-ed, and is different using the liquefied object which contains a color filter ingredient in this invention as a liquefied object which carries out the regurgitation.
[0024] (5) It is convenient for manufacturing the device which breathes out the liquefied object which has a fluidity in this invention on the base material which is discharged substance-ed, and has a base material.
[0025]
[Embodiment of the Invention] (**** about the manufacture approach of a color filter, and a manufacturing installation the 1) The manufacture approach of the color filter of this invention, the fundamental approach of the manufacturing installation, and a configuration are explained hereafter. First, before explaining those manufacture approaches and manufacturing installations, the color filter manufactured using those manufacture approaches etc. is explained. Drawing 5 (a) shows typically the planar structure of the gestalt of 1 operation of a color filter. Moreover, drawing 6 (d) shows the cross-section structure according to the VI-VI line of drawing 5 (a).
[0026] The color filter 1 of the gestalt of this operation forms two or more filter elements 3 in the front face of the substrate (in this invention, it is also called a "base material".) 2 of the shape of a rectangle formed by glass, plastics, etc. in the shape of a dot matrix with the shape of

a dot pattern, and the gestalt of this operation. Furthermore, the color filter 1 is formed by carrying out the laminating of the protective coat 4 on the filter element 3, as shown in drawing 6 (d). In addition, drawing 5 (a) shows superficially the color filter 1 in the condition of having removed the protective coat 4. That is, with the gestalt of this operation, the filter element 3 as a color pattern formed of an ink jet is illustrated.
[0027] A filter element 3 is formed by fill uping with color material the field of the shape of two or more rectangle which was divided by the septum 6 formed in the grid-like pattern with the resin ingredient without translucency, and was located in a line in the shape of a dot matrix. Moreover, these filter elements 3 are formed of the color material of any 1 color of R (red), G (green), and the B (blue), respectively, and the filter element 3 of each of those colors is put in order by the predetermined array. As this array, the so-called stripe array shown in drawing 7 (a), the so-called mosaic array shown in drawing 7 (b), the so-called delta array shown in drawing 7 (c) are known, for example. In addition, the "septum" in this invention is used as language also including the semantics of a "bank", and points out the part which sees from the substrate which sees from a substrate and has the side face and the side face which had 90 degrees or more and the include angle of the following in general of an almost perpendicular include angle, and becomes a convex.
[0028] And a stripe array is an array which all the columns of a matrix turn into in the same color. Moreover, a mosaic array is a color scheme in which three filter elements 3 of the arbitration located in a line on the straight line in every direction become three colors of R, G, and B. Furthermore, a delta array is a color scheme in which three filter elements 3 to which arrangement of a filter element 3 is carried out in a completely different class, and which arbitration adjoins become three colors of R, G, and B.
[0029] The magnitude of a color filter 1 is about 4.57cm (1.8 inches). Moreover, the magnitude of one filter element 3 is 30micrometerx100micrometer. And spacing between each filter element 3 and the pitch between the so-called elements are 75 micrometers.
[0030] In using the color filter 1 of the gestalt of this operation as an optical element for a full color display, it performs a full color display by forming one pixel for R, G, and the B3 piece filter element 3 as one unit, and making any one or those combination of R, G, and B in 1 pixel pass light alternatively. At this time, the septum 6 formed with the resin ingredient without translucency acts as a black mask.
[0031] The above-mentioned color filter 1 is cut down from the mother substrate 12 of the large area which is a substrate as shown in drawing 5 (b). Specifically, the pattern for one piece of a color filter 1 is first formed in each front face of two or more color filter formation fields 11 set up in the mother substrate 12. And each color filter 1 is formed by forming the slot for cutting in the surroundings of those color filter formation fields 11, and cutting the mother substrate 12 along those slots.
[0032] The manufacture approach of manufacturing hereafter the color filter 1 shown in drawing 5 (a), and its manufacturing installation are explained.
[0033] Drawing 6 shows the manufacture approach of a color filter 1 typically in order of the process. First, with the resin ingredient which does not have translucency in the front face of the mother substrate 12, a septum 6 is seen from arrow-head B, and it forms in a grid-like pattern. The part 7 of the grid hole of a grid-like pattern is the field in which a filter element 3 is formed, i.e., a filter-element formation field. The flat-surface dimension at the time of seeing from [of each filter-element formation field 7 formed by this septum 6] arrow-head B is formed in about 30micrometerx100micrometer.
[0034] A septum 6 has collectively the function which prevents a flow of the filter-element ingredient 13 as a liquefied object supplied to the filter-element formation field 7, and the function of a black mask. Moreover, a septum 6 is formed by the patterning technique of arbitration, for example, the photolithography method, and is further heated and calcinated at a heater if needed.
[0035] As shown in drawing 6 (b) after formation of a septum 6, each filter-element formation field 7 is filled with the filter-element ingredient 13 by supplying the drop 8 of the filter-element ingredient 13 to each filter-element formation field 7. In drawing 6 (b), sign 13R shows the filter-

element ingredient which has the color of R (red), and sign 13G show the filter-element ingredient which has the color of G (green), and sign 13B shows the filter-element ingredient which has the color of B (blue). In addition, suppose that a "drop" is also called "ink" in this invention.

[0036] If each filter-element formation field 7 is filled up with the filter-element ingredient 13 of the specified quantity, at a heater, the mother substrate 12 will be heated at about 70 degrees C, and the solvent of the filter-element ingredient 13 will be evaporated. By this evaporation, as shown in drawing 6 (c), the volume of the filter-element ingredient 13 decreases and carries out flattening. When reduction in the volume is intense, supply and heating of a drop 8 of the drop 8 of the filter-element ingredient 13 are repeated and performed until thickness sufficient as a color filter 1 is obtained. The filter element 3 of each color which only the solid content of the filter-element ingredient 13 remains and film-izes, and finally wishes by this by the above processing is formed.

[0037] After a filter element 3 is formed, in order to dry those filter elements 3 completely by the above, heat-treatment of predetermined time is performed at predetermined temperature. Then, for example, a protective coat 4 is formed using proper technique, such as a spin coat method, the roll coat method, the ripping method, or the ink jet method. This protective coat 4 is formed for flattening of protection of a filter element 3 etc., and the front face of a color filter 1. In addition, although considered as the black matrix by making the resin of a septum 6 into non-translucency with the operation gestalt of this invention, the resin of a septum 6 may use the septum of the multilayer structure which forms the protection-from-light layer which turns into a lower layer of resin from metals, such as Cr of size somewhat larger than resin, as a thing of translucency.

[0038] Drawing 8 is one component device which constitutes the manufacturing installation of a color filter, and shows the gestalt of 1 operation of the drop regurgitation equipment for performing the provisioning process of the filter-element ingredient 13 shown in drawing 6 (b). This drop regurgitation equipment 16 is equipment for making the filter-element ingredient 13 of an one color in R, G, and B, for example, R color, breathe out and adhere to the predetermined location in each color filter formation field 11 in the mother substrate 12 (to refer to drawing 5 (b)) as a drop 8 of ink. Although the drop regurgitation equipment 16 for the filter-element ingredient 13 of G color and the filter-element ingredient 13 of B color is also prepared for each, since those structures can be made the same as the thing of drawing 8 , the explanation about them is omitted.

[0039] The head unit 26 equipped with the ink jet head 22 for which drop regurgitation equipment 16 is used by a printer etc. as an example of a drop discharge head in drawing 8 , The head positional controller 17 which controls the location of the ink jet head 22, The substrate positional controller 18 which controls the location of the mother substrate 12, and the horizontal-scanning driving gear 19 as a horizontal-scanning driving means which carries out horizontal-scanning migration of the ink jet head 22 to the mother substrate 12, The vertical-scanning driving gear 21 as a vertical-scanning driving means which carries out vertical-scanning migration of the ink jet head 22 to the mother substrate 12, It has the control apparatus 24 which manages whole control of the substrate feeder 23 which supplies the mother substrate 12 to the predetermined activity location in drop regurgitation equipment 16, and drop regurgitation equipment 16.

[0040] Each equipment of the head positional controller 17, the substrate positional controller 18, the horizontal-scanning driving gear 19 that carries out horizontal-scanning migration of the ink jet head 22 to the mother substrate 12, and the vertical-scanning driving gear 21 is installed on the base 9. Moreover, each of those equipments are covered with covering 14 if needed.

[0041] The ink jet head 22 has the nozzle train 28 formed by arranging two or more nozzles 27 in seriate, as shown in drawing 10 . The number of nozzles 27 is 180, the aperture of a nozzle 27 is 28 micrometers, and the nozzle pitch between nozzles 27 is 141 micrometers. In drawing 5 (a) and drawing 5 (b), the direction Y of vertical scanning which intersects perpendicularly with the main scanning direction X and it to a color filter 1 and the mother substrate 12 is set up as illustration in drawing 10 .

[0042] The ink jet head 22 makes the filter-element ingredient 13 adhere to the predetermined location in the mother substrate 12 (to refer to drawing 5 (b)) by carrying out the regurgitation of the filter-element ingredient 13 as ink alternatively from two or more nozzles 27, while a location is carried out so that it may extend in the direction where that nozzle train 28 intersects a main scanning direction X, and carrying out a parallel displacement relatively to this main scanning direction X. Moreover, the ink jet head 22 can shift the horizontal-scanning location by the ink jet head 22 at the predetermined spacing by carrying out parallel translation only of the predetermined distance relatively in the direction Y of vertical scanning.
[0043] The ink jet head 22 has the internal structure shown in drawing 12 (a) and drawing 12 (b). Specifically, the ink jet head 22 has two or more batch members 32 which join them to the nozzle plate 29 made from stainless steel, and the diaphragm 31 which counters it mutually. Between a nozzle plate 29 and a diaphragm 31, two or more ink rooms 33 and ****** 34 are formed of the batch member 32. Two or more ink rooms 33 and ****** 34 are mutually open for free passage through a path 38.
[0044] The ink feed holes 36 are formed in the proper place of a diaphragm 31, and the ink feeder 37 is connected to these ink feed holes 36. This ink feeder 37 supplies the filter-element ingredient M of an one color in R, G, and B, for example, R color, to the ink feed holes 36. It is [ingredient / M / which was supplied / filter-element] full of ****** 34, and further full of the ink room 33 through a path 38. [ingredient]
[0045] The nozzle 27 for injecting the filter-element ingredient M in the shape of jet from the ink room 33 is formed in the nozzle plate 29. Moreover, the rear face of the field which forms the ink room 33 of a diaphragm 31 is made to correspond to this ink room 33, and the ink pressurization object 39 is attached in it. This ink pressurization object 39 has the electrodes 42a and 42b of the pair which pinches a piezoelectric device 41 and this, as shown in drawing 12 (b). It bends and a piezoelectric device 41 deforms so that it may project by energization to Electrodes 42a and 42b to the outside shown by the arrow head C, and thereby, the volume of the ink room 33 increases. Then, the filter-element ingredient M equivalent to a part for the volume which increased flows into the ink room 33 through a path 38 from ****** 34.
[0046] Next, if the energization to a piezoelectric device 41 is canceled, this piezoelectric device 41 and diaphragm 31 will return [both] to the original configuration. Thereby, since the ink room 33 also returns to the original volume, the pressure of the filter-element ingredient M in the interior of the ink room 33 rises, and from a nozzle 27, towards the mother substrate 12 (refer to drawing 5 (b)), the filter-element ingredient M serves as a drop 8, and it spouts. in addition -- the periphery of a nozzle 27 -- the hole of the flight deflection of a drop 8, or a nozzle 27 -- the ** ink layer 43 which consists of a nickel-tetrafluoroethylene eutectoid deposit in order to prevent plugging etc. is formed.
[0047] In drawing 9 , the head positional controller 17 has the Z motor 48 to which the parallel displacement of the alpha motor 44 to which the field internal version of the ink jet head 22 is carried out, the beta motor 46 which carries out rocking rotation of the ink jet head 22 at the circumference of an axis parallel to the direction Y of vertical scanning, the gamma motor 47 which carries out rocking rotation of the ink jet head 22 at the circumference of an axis parallel to a main scanning direction, and the ink jet head 22 is carried out in the vertical direction.
[0048] The substrate positional controller 18 shown in drawing 8 has the table 49 which carries the mother substrate 12, and the theta motor 51 to which the field internal version of the table 49 is carried out like an arrow head theta in drawing 9 . Moreover, the horizontal-scanning driving gear 19 shown in drawing 8 has the X guide rail 52 prolonged to a main scanning direction X, and the X slider 53 which built in the linear motor by which a pulse drive is carried out, as shown in drawing 9 . When the linear motor to build in operates, along with the X guide rail 52, the parallel displacement of the X slider 53 is carried out to a main scanning direction.
[0049] Moreover, the vertical-scanning driving gear 21 shown in drawing 8 has the Y guide rail 54 prolonged in the direction Y of vertical scanning, and the Y slider 56 which built in the linear motor by which a pulse drive is carried out, as shown in drawing 9 . When the linear motor to build in operates, along with the Y guide rail 54, the parallel displacement of the Y slider 56 is carried out in the direction Y of vertical scanning.

[0050] The linear motor by which a pulse drive is carried out into the X slider 53 or the Y slider 56 can control the location on the main scanning direction X of the ink jet head 22 which could perform angle-of-rotation control of an output shaft minutely by the pulse signal supplied to this motor, therefore was supported by the X slider 53, the location on the direction Y of vertical scanning of a table 49, etc. with high definition. In addition, the position control of the ink jet head 22 or a table 49 is not restricted to the position control which used the pulse motor, but can also be realized by the feedback control using a servo motor, and the control approach of other arbitration.
[0051] The substrate feeder 23 shown in drawing 8 has the substrate hold section 57 which holds the mother substrate 12, and the robot 58 which conveys the mother substrate 12. A robot 58 has the pedestal 59 put on installation sides, such as a floor and the ground, the rise-and-fall shaft 61 which carries out rise-and-fall migration to a pedestal 59, the 1st arm 62 which rotates the rise-and-fall shaft 61 as a core, the 2nd arm 63 rotated to the 1st arm 62, and the adsorption pad 64 prepared in the tip inferior surface of tongue of the 2nd arm 63. The adsorption pad 64 can adsorb the mother substrate 12 by air suction etc.
[0052] In drawing 8 , by the horizontal-scanning driving gear 19, it drives, and it is under the locus of the ink jet head 22 which carries out horizontal-scanning migration, and capping equipment 76 and cleaning equipment 77 are arranged in one near location of the vertical-scanning driving gear 21. Moreover, the electronic balance 78 is arranged in the near location of another side. Cleaning equipment 77 is equipment for washing the ink jet head 22. The electronic balance 78 is a device which measures the weight of the drop 8 of the ink breathed out from each nozzle 27 (refer to drawing 10) in the ink jet head 22 for every nozzle. And capping equipment 76 is equipment for preventing desiccation of a nozzle 27 (refer to drawing 10), when the ink jet head 22 is in a standby condition.
[0053] Near the ink jet head 22, the camera 81 for heads is arranged by the relation which moves to the ink jet head 22 and one. Moreover, the camera 82 for substrates supported by the means for supporting (not shown) formed on the base 9 is arranged in the location which can photo the mother substrate 12.
[0054] The control apparatus 24 shown in drawing 8 has the body section 66 of a computer which held the processor, a keyboard as an input device 67, and the CRT (Cathode-Ray Tube) display 68 as an indicating equipment. The above-mentioned processor has, as shown in drawing 14 , CPU (Central Processing Unit)69 which performs data processing, and the memory 71, i.e., the information storage, which memorizes various information.
[0055] Each device of the head drive circuit 72 which drives the piezoelectric device 41 (refer to drawing 12 (b)) in the head positional controller 17 shown in drawing 8 , the substrate positional controller 18, the horizontal-scanning driving gear 19, the vertical-scanning driving gear 21, and the ink jet head 22 is connected to CPU69 through an input/output interface 73 and a bus 74 in drawing 14 . Moreover, each device of the substrate feeder 23, an input device 67, CRT display 68, the electronic balance 78, cleaning equipment 77, and capping equipment 76 is also connected to CPU69 through an input/output interface 73 and a bus 74.
[0056] The memory as an information storage medium 71 RAM (Random Access Memory), Semiconductor memory called ROM (Read Only Memory) etc., It is a concept containing external storage, such as a hard disk, a CD-ROM reader, and a disk mold storage, etc. functionally The storage region which memorizes the program software with which the control procedure of actuation of drop regurgitation equipment 16 was described, The storage region for memorizing the regurgitation location in the mother substrate 12 (referring to drawing 5) of one color in R, G, and B for realizing various kinds of R and G which are shown in drawing 7 , and B array as coordinate data, In addition to this, the field which functions as the storage region for memorizing the vertical-scanning movement magnitude of the mother substrate 12 to the direction Y of vertical scanning in drawing 9 , the work area for CPU69, a temporary file, etc., and various kinds of storage regions are set up.
[0057] CPU69 performs control for carrying out the regurgitation of ink 13, i.e., the filter-element ingredient, to the mother substrate 12 in a surface predetermined location according to the program software memorized in the memory which is the information storage medium 71. It has

the cleaning operation part which performs the operation for realizing cleaning treatment as a concrete functional implementation part, the capping operation part for realizing capping processing, the gravimetry operation part which performs the operation for realizing the gravimetry using the electronic balance 78 (referring to drawing 8), and the drawing operation part which performs the operation for drawing the filter-element ingredient 13 by the drop regurgitation.
[0058] The drawing starting position operation part for setting the ink jet head 22 to the initial valve position for drawing, if drawing operation part is divided in detail, The horizontal-scanning control operation part which calculates the control for carrying out scan migration of the ink jet head 22 at the rate of predetermined to a main scanning direction X, The vertical-scanning control operation part which calculates control only for the predetermined amount of vertical scanning to shift the mother substrate 12 in the direction Y of vertical scanning, It has various kinds of functional operation part called the nozzle regurgitation control operation part which performs the operation for controlling whether any of two or more nozzles 27 in the ink jet head 22 are operated, and the regurgitation of ink, i.e., the filter-element ingredient, is carried out.
[0059] In addition, although each above-mentioned function was carried out to realizing in software using CPU69 with the gestalt of this operation, when each above-mentioned function can be realized by the independent electronic circuitry which does not use CPU69, it is also possible to use such an electronic circuitry.
[0060] It explains based on the flow chart which shows actuation of the drop regurgitation equipment 16 which consists of the above-mentioned configuration hereafter to drawing 15 .
[0061] If drop regurgitation equipment 16 operates by powering on by the operator, in step S1, initial setting will be realized first. Specifically, the head unit 26, the substrate feeder 23, a control apparatus 24, etc. are set to the initial state decided beforehand.
[0062] Next, if gravimetry timing comes (it is YES at step S2), the head unit 26 of drawing 9 will be moved to the place of the electronic balance 78 of drawing 8 with the horizontal-scanning driving gear 19 (step S3), and the amount of the ink breathed out from a nozzle 27 will be measured using the electronic balance 78 (step S4). And according to the ink regurgitation property of a nozzle 27, the electrical potential difference impressed to the piezoelectric device 41 corresponding to each nozzle 27 is adjusted (step S5).
[0063] Then, if cleaning timing comes (it is YES at step S6), the head unit 26 will be moved to the place of cleaning equipment 77 with the horizontal-scanning driving gear 19 (step S7), and the ink jet head 22 will be cleaned with that cleaning equipment 77 (step S8).
[0064] When neither gravimetry timing nor cleaning timing comes (it is NO at steps S2 and S6), or when those processings are completed, in step S9, the substrate feeder 23 of drawing 8 is operated and the mother substrate 12 is supplied to a table 49. Specifically, suction maintenance of the mother substrate 12 in the substrate hold section 57 is carried out with the adsorption pad 64. Next, the rise-and-fall shaft 61, the 1st arm 62, and the 2nd arm 63 are moved, even a table 49 is conveyed and the mother substrate 12 is pushed against the gage pin 50 (refer to drawing 9) further prepared for the proper place of a table 49 beforehand. In addition, in order to prevent location gap of the mother substrate 12 on a table 49, it is desirable to fix the mother substrate 12 to a table 49 with means, such as air suction.
[0065] Next, observing the mother substrate 12 with the camera 82 for substrates of drawing 8 , by rotating the output shaft of the theta motor 51 of drawing 9 in a minute include-angle unit, the field internal version of the table 49 is carried out in a minute include-angle unit, and the mother substrate 12 is positioned (step S10). Then, an operation determines the location which starts drawing by the ink jet head 22, observing the mother substrate 12 with the camera 81 for heads of drawing 8 (step S11). And the horizontal-scanning driving gear 19 and the vertical-scanning driving gear 21 are operated suitably, and the ink jet head 22 is moved to a drawing starting position (step S12).
[0066] At this time, as shown in the (a) location of drawing 1 , the ink jet head 22 is arranged so that the nozzle train 28 may incline at an include angle theta to the direction Y of vertical scanning of the ink jet head 22. This is a measure for [which the dimension component of the direction Y of vertical scanning of the pitch between nozzles spreads / target / an element

pitch , / geometrical] making it become , when the pitch between nozzles which is spacing between the adjacent nozzles 27 differs from the element pitch which is spacing between the adjacent filter elements 3 7 , i.e. , a filter element formation field , in many cases in the case of usual drop regurgitation equipment and the ink jet head 22 is move to a main scanning direction X .

[0067] If the ink jet head 22 is put on a drawing starting position at step S12 of drawing 15 , in drawing 1 , the ink jet head 22 will be put on the (a) location. Then, horizontal scanning to a main scanning direction X is started at step S13 of drawing 15 , and the regurgitation of ink is started by coincidence. The horizontal-scanning driving gear 19 of drawing 9 operates, the ink jet head 22 specifically carries out scan migration linearly at a fixed rate to the main scanning direction X of drawing 1 , and during the migration, when the nozzle 27 corresponding to the filter-element formation field 7 which should supply ink reaches, ink, i.e., a filter-element ingredient, is breathed out from the nozzle 27.

[0068] In addition, the ink discharge quantity at this time is one fourth of amounts of the whole quantity with 1/several [of that whole quantity instead of the amount which buries all the volume of the filter-element formation field 7] gestalten of this operation. It is because all volume is for each filter-element formation field 7 not to be filled by 1 time of the ink regurgitation from a nozzle 27, but to be fill uped with the heavy regurgitation of several times of ink regurgitation, and the gestalt of this operation by 4 times of heavy regurgitation so that this may be mentioned later.

[0069] After horizontal scanning for one line to the mother substrate 12 is completed (it is YES at step S14), the inversion transfer of the ink jet head 22 is carried out, and it returns to an initial valve position (a) (step S15). And only the amount delta of vertical scanning which drove with the vertical-scanning driving gear 21, and was beforehand decided in the direction Y of vertical scanning moves the ink jet head 22 further (step S16).

[0070] With the gestalt of this operation, CPU69 divides notionally into two or more groups n two or more nozzles 27 which form the nozzle train 28 of the ink jet head 22 in drawing 1 . With the gestalt of this operation, the nozzle train 28 of die-length L which consists of n= 4 [27], i.e., 180 nozzles, is divided and considered in four groups. Thereby, one nozzle group is decided in a nozzle 27, to be die-length L/n, L/4 [i.e.,], containing 180 / 4= 45 [an individual]. The above-mentioned amount delta of vertical scanning is set to the above-mentioned vertical-scanning lay length of nozzle group die-length L / 4, i.e., (L/4), costheta.

[0071] Therefore, the ink jet head 22 which horizontal scanning for one line was completed and returned to the initial valve position (a) carries out the parallel displacement only of the distance delta in the direction Y of vertical scanning in drawing 1 , and moves to a location (b). In addition, although a location (a) and a location (b) shift for a while and are drawn about the main scanning direction X in drawing 1 , this is a measure for giving explanation intelligible, and a location (a) and a location (b) are the same locations about a main scanning direction X in fact.

[0072] The ink jet head 22 which carried out vertical-scanning migration repeats and performs horizontal-scanning migration and the ink regurgitation at step S13 to a location (b). At the time of this horizontal-scanning migration, while Rhine of eye two trains in the color filter formation field 11 on the mother substrate 12 will not receive the ink regurgitation without a top nozzle group, as for Rhine of eye one train, the 2nd nozzle group receives the 2nd ink regurgitation from a head.

[0073] The ink jet head 22 repeats horizontal-scanning migration and the ink regurgitation after this, repeating vertical-scanning migration like a location (c) - a location (k) (steps S13-S16). Thereby, the ink adhesion processing for one train of the color filter formation field 11 of the mother substrate 12 is completed. Since the nozzle train 28 was divided into four groups and the amount delta of vertical scanning was determined, after above-mentioned horizontal scanning and above-mentioned vertical scanning for one train of the color filter formation field 11 are completed, with the gestalt of this operation, as for each filter-element formation field 7, whole-quantity supply of the ink, i.e., filter-element ingredient, of the specified quantity is done in total by four nozzle groups into the complete product in response to four ink regurgitation processings by a unit of 1 time, respectively.

[0074] In this way, if the ink regurgitation for one train of the color filter formation field 11 is completed, the ink jet head 22 will be driven with the vertical-scanning driving gear 21, and will be conveyed to the initial valve position of the color filter formation field 11 of the following train (step S19). And horizontal scanning, vertical scanning, and the ink regurgitation are repeated to the color filter formation field 11 of the train concerned, and a filter element is formed in the filter-element formation field 7 (steps S13-S16).
[0075] Then, if the filter element 3 of an one color of R, G, and B, for example, one color of R, is formed about all the color filter formation fields 11 in the mother substrate 12 (it is YES at step S18), the mother substrate 12 after processing will be discharged by the substrate feeder 23 or another conveyance device in the mother substrate 12 at step S20 outside. then, directions of processing termination should do by the operator -- as long as there is nothing (it is NO at step S21), it returns to step S2, and the ink ** arrival activity about one color of R to another mother substrate 12 is repeated, and is performed.
[0076] If there are directions of activity termination from an operator (it is YES at step S21), CPU69 will convey the ink jet head 22 to the place of capping equipment 76 in drawing 8 , and will perform capping processing to the ink jet head 22 with the capping equipment 76 (step S22).
[0077] By the above, patterning about the 1st color of the R and G, and B3 colors, for example, R color, is completed. [which constitute a color filter 1] Then, it conveys to the drop regurgitation equipment 16 which uses the mother substrate 12 the 2nd color of R, G, and B, and uses G color as a filter-element ingredient, and patterning of G color is performed. Furthermore, it conveys to the drop regurgitation equipment 16 which finally uses as a filter-element ingredient, the 3rd color, for example, B color, of R, G, and B, and patterning of B color is performed. The mother substrate 12 with which two or more color filters 1 (drawing 5 (a)) which have the dot array of R, G, and B of a hope called a stripe array etc. were formed by this is manufactured. By cutting this mother substrate 12 every color filter formation field 11, two or more one color filters 1 are cut down.
[0078] In addition, the laminating of an electrode, the orientation film, etc. will be further carried out to the front face of the thing which uses this color filter 1 for the color display of liquid crystal equipment, then this color filter 1. In such a case, if the mother substrate 12 is cut and each color filter 1 is cut down before carrying out the laminating of an electrode, the orientation film, etc., formation processes, such as a subsequent electrode, will become very troublesome. Therefore, in such a case, after ending in required addition processes, such as electrode formation and orientation film formation, rather than cutting the mother substrate 12, it is desirable to cut the mother substrate 12.
[0079] As mentioned above, according to the manufacture approach of a color filter and manufacturing installation concerning the gestalt of this operation Each filter element 3 in the color filter 1 shown in drawing 5 (a) is not formed of one horizontal scanning X of the ink jet head 22 (refer to drawing 1). One filter element 3 each is formed in predetermined thickness by receiving the ink regurgitation in piles 4 times with the gestalt of this operation n times of two or more nozzles 27 belonging to a different nozzle group. For this reason, even when variation exists in ink discharge quantity among two or more nozzles 27 temporarily, it can prevent that variation arises in thickness among two or more filter elements 3, and, so, the light transmission property of a color filter 1 can be superficially made into homogeneity.
[0080] Of course, by the manufacture approach of the gestalt this operation, since a filter element 3 is formed by the ink regurgitation which used the ink jet head 22, it is not necessary to pass through a complicated process like the approach using the photolithography method and, and an ingredient is not wasted.
[0081] By the way, it is as having explained in relation to drawing 36 (a) that distribution of the ink discharge quantity of two or more nozzles 27 which form the nozzle train 28 of the ink jet head 22 becomes an ununiformity. Moreover, the thing which exist especially in the both ends of the nozzle train 28 and which ink discharge quantity of the nozzle [especially] 27 of ** increases is also as description ten pieces at a time an one end side partly. Thus, compared with other nozzles 27, especially the thing for which many nozzles 27 are used does not have desirable ink discharge quantity about making thickness of ink **** 3, i.e., a filter element, into

homogeneity.
[0082] Therefore, desirably, as shown in drawing 13 , it is good to set up about ten ink beforehand partly with the thing which exists in the both ends E of the nozzle train 28 among two or more nozzles 27 which form the nozzle train 28 and which does not carry out the regurgitation, to divide into plurality, for example, four groups, the nozzle 27 which exists in the remaining part F, and to perform vertical-scanning migration per the nozzle group.
[0083] In this operation gestalt, although the resin ingredient which does not have translucency as a septum 6 was used, of course, it is also possible to use the resin ingredient of translucency as a septum 6 of translucency. In this case, if it is, the metal membrane or resin ingredients of protection-from-light nature, such as Cr, are separately prepared in the bottom of a septum 6 etc., and it is [the location corresponding to between filter elements 3 for example, a septum 6 top,] good for it also as a black mask. Moreover, it is good also as a configuration which forms a septum 6 with the resin ingredient of translucency, and does not prepare a black mask.
[0084] Moreover, in this operation gestalt, although R, G, and B were used as a filter element 3, of course, it is not limited to R, G, and B, for example, C (cyanogen), M (MAZENDA), and Y (yellow) may be adopted. In that case, what is necessary is to replace with the filter-element ingredient of R, G, and B, and just to use the filter-element ingredient which has the color of C, M, and Y, if it is.
[0085] Furthermore, in this operation gestalt, although the septum 6 was formed with photolithography, it is possible to form a septum 6 by the ink jet method as well as a color filter 1.
[0086] (**** about the manufacture approach of a color filter, and a manufacturing installation the 2) Drawing 2 is drawing for explaining the manufacture approach of the color filter concerning this invention explained previously, and the modification of the manufacturing installation, and shows typically the case where ink 13, i.e., a filter-element ingredient, is supplied to each filter-element formation field 7 in the color filter formation field 11 in the mother substrate 12 by the regurgitation using the ink jet head 22.
[0087] The process of the outline carried out according to the gestalt of this operation is the same as the process shown in drawing 6 , and the same as the equipment and the device target which also showed the drop regurgitation equipment used for ink ** arrival to drawing 8 . Moreover, CPU69 also of carrying out the group division of two or more nozzles 27 which form the nozzle train 28 notionally at n pieces (four [for example,]), making it correspond to each nozzle group's die-length L/n or L/4, and also determining the amount delta of vertical scanning of drawing 14 is the same as that of the case of drawing 1 .
[0088] The point that the gestalt of this operation differs from the gestalt of previous operation shown in drawing 1 is having added the alteration to the program software stored in drawing 14 in the memory which is the information storage 71, and is having added the alteration to the horizontal-scanning control operation specifically performed by CPU69, and the vertical-scanning control operation.
[0089] If it explains more concretely, in drawing 2 , the ink jet head 22, without carrying out return migration to an initial valve position after termination of the scan migration to a main scanning direction X After only the movement magnitude delta equivalent to one nozzle group moving in the direction of vertical scanning immediately and moving to a location (b) after termination of horizontal-scanning migration in one direction, It is controlled to return to the location (b') where scan migration was performed to the opposite direction of the one above-mentioned direction of a main scanning direction X, and only distance delta shifted in the direction of vertical scanning from the initial valve position (a). In addition, of course in the period of both between the horizontal-scanning migration in a location (b') between horizontal scanning from a location (a) to a location (b), and from a location (b), ink is alternatively breathed out from two or more nozzles 27.
[0090] That is, with the gestalt of this operation, it is carried out by turns continuously, without horizontal scanning and vertical scanning of the ink jet head 22 sandwiching return actuation, this omits the time amount spent for return actuation, and working hours can be shortened.
[0091] (**** about the manufacture approach of a color filter, and a manufacturing installation

the 3) Drawing 3 is drawing for explaining the manufacture approach of the color filter concerning this invention explained previously, and the modification of the manufacturing installation, and shows typically the case where ink 13, i.e., a filter-element ingredient, is supplied to each filter-element formation field 7 in the color filter formation field 11 in the mother substrate 12 by the regurgitation using the ink jet head 22.
[0092] The process of the outline carried out according to the gestalt of this operation is the same as the process shown in drawing 6 , and the same as the equipment and the device target which also showed the drop regurgitation equipment used for ink ** arrival to drawing 8 . Moreover, CPU69 also of carrying out the group division of two or more nozzles 27 which form the nozzle train 28 notionally at n pieces (four [for example,]), making it correspond to each nozzle group's die-length L/n or L/4, and also determining the amount delta of vertical scanning of drawing 14 is the same as that of the case of drawing 1 .
[0093] When the point that the gestalt of this operation differs from the gestalt of previous operation shown in drawing 1 sets the ink jet head 22 to the drawing starting position of the mother substrate 12 at step S12 of drawing 15 , the ink jet head 22 is the point that the direction where the nozzle train 28 is prolonged is parallel to the direction Y of vertical scanning, as shown in the (a) location of drawing 3 . It has [pitch / about the mother substrate 12 / the pitch between nozzles about the ink jet head 22, / between elements] such array structure of a nozzle, it is, and is structure advantageous to a case.
[0094] Also in the gestalt of this operation, the ink jet head 22 carries out the regurgitation of ink, i.e., the filter-element ingredient, alternatively from two or more nozzles 27 during the period of horizontal-scanning migration, repeating the scan migration to a main scanning direction X, the return migration to an initial valve position, and the vertical-scanning migration with the movement magnitude delta to the direction Y of vertical scanning until it reaches [from an initial valve position (a)] a termination location (k). Thereby, a filter-element ingredient is made to adhere into the filter-element formation field 7 in the color filter formation field 11 in the mother substrate 12.
[0095] In addition, with the gestalt of this operation, the location of the nozzle train 28 is carried out in parallel to the direction Y of vertical scanning. The vertical-scanning movement magnitude delta is spread, a nozzle group's die-length L/n, L/4 [i.e.,] etc., etc. which were divided, and set up by this.
[0096] (**** about the manufacture approach of a color filter, and a manufacturing installation the 4) Drawing 4 is drawing for explaining the manufacture approach of the color filter concerning this invention explained previously, and the modification of the manufacturing installation, and shows typically the case where ink, i.e., a filter-element ingredient, is supplied to each filter-element formation field 7 in the color filter formation field 11 in the mother substrate 12 by the regurgitation using the ink jet head 22.
[0097] The process of the outline carried out according to the gestalt of this operation is the same as the process shown in drawing 6 , and the same as the equipment and the device target which also showed the drop regurgitation equipment used for ink ** arrival to drawing 8 . Moreover, CPU69 also of carrying out the group division of two or more nozzles 27 which form the nozzle train 28 notionally at n pieces (four [for example,]), making it correspond to each nozzle group's die-length L/n or L/4, and also determining the amount delta of vertical scanning of drawing 14 is the same as that of the case of drawing 1 .
[0098] The point that the gestalt of this operation differs from the gestalt of previous operation shown in drawing 1 When the ink jet head 22 is set to the drawing starting position of the mother substrate 12 at step S12 of drawing 15 , The ink jet head 22 is the point that the direction where the nozzle train 28 is prolonged is parallel to the direction Y of vertical scanning, and a point performed by turns continuously, without horizontal scanning and vertical scanning of the ink jet head 22 sandwiching return actuation like the case where it is the gestalt of operation of drawing 2 , as shown in drawing 4 (a).
[0099] in addition, with the gestalt of previous operation shown in the gestalt and drawing 3 of this operation which are shown in drawing 4 , since a main scanning direction X turns into the direction of a right angle to the nozzle train 28, the nozzle train 28 is shown in drawing 11 -- as

-- a main scanning direction X -- meeting -- 2 successive-installation **** -- the filter-element ingredient 13 can be supplied to one filter-element formation field 7 by two nozzles 27 which appeared in the same horizontal-scanning Rhine by things.
[0100] (**** about the manufacture approach of a color filter, and a manufacturing installation the 5) Drawing 16 is drawing for explaining the manufacture approach of the color filter concerning this invention explained previously, and the modification of the manufacturing installation, and shows ink jet head 22A. The point that this ink jet head 22A differs from the ink jet head 22 shown in drawing 10 forms in one ink jet head 22A three kinds of nozzle trains nozzle train 28B which carries out the regurgitation of the B color ink to nozzle train 28R which carries out the regurgitation of the R color ink, and nozzle train 28G which carry out the regurgitation of the G color ink. It is having prepared the ink regurgitation system shown in drawing 12 (a) and drawing 12 (b) in these three kinds of each, having connected R ink feeder 37R to the ink regurgitation system corresponding to R color nozzle train 28R, having connected G ink feeder 37G to the ink regurgitation system corresponding to G color nozzle train 28G, and having connected B ink feeder 37B to the ink regurgitation system corresponding to B color nozzle train 28B.
[0101] The process of the outline carried out according to the gestalt of this operation is the same as the process shown in drawing 6 , and the same as the equipment and the device target which also showed the drop regurgitation equipment used for ink ** arrival to drawing 8 . Moreover, CPU69 also of carrying out the group division of two or more nozzles 27 which form the nozzle trains 28R, 28G, and 28B notionally at n pieces (four [for example,]), and also carrying out vertical-scanning migration of the ink jet head 22A with the vertical-scanning movement magnitude delta for every nozzle groups of those of drawing 14 is the same as that of the case of drawing 1 .
[0102] With the gestalt of operation shown in drawing 1 , since one kind of nozzle train 28 was only formed in the ink jet head 22, in case a color filter 1 is formed by R, G, and B3 color, the ink jet head 22 shown in drawing 8 must be prepared about each three color of R, G, and B. On the other hand, since three colors of R, G, and B can be made to adhere to the mother substrate 12 at coincidence by one horizontal scanning to the main scanning direction X of ink jet head 22A when using ink jet head 22A of the structure shown in drawing 16 , if it prepares, it is sufficient only for one ink jet head 22. Moreover, coincidence **** of R, G, and B3 color becomes possible by doubling nozzle train 28 spacing of each color with the pitch of the filter-element formation field 7 of the mother substrate 12.
[0103] (Explanation about the manufacture approach of the electro-optic device using a color filter, and a manufacturing installation) Drawing 17 shows the gestalt of 1 implementation of the manufacture approach of the liquid crystal equipment as an example of the electro-optic device concerning this invention. Moreover, drawing 18 shows the gestalt of 1 operation of the liquid crystal equipment manufactured by the manufacture approach. Moreover, drawing 19 shows the cross-section structure of liquid crystal equipment where the IX-IX line in drawing 18 was followed. In advance of the manufacture approach of liquid crystal equipment, and explanation of the manufacturing installation, first, the example is given and the liquid crystal equipment manufactured by the manufacture approach is explained. In addition, the liquid crystal equipment of the gestalt of this operation is liquid crystal equipment of the transflective reflective method which performs a full color display by the passive matrix.
[0104] In drawing 18 , liquid crystal equipment 101 mounts IC103a for a liquid crystal drive as a semiconductor chip, and IC103b for a liquid crystal drive in a liquid crystal panel 102, and connects FPC (Flexible Printed Circuit)104 as a wiring connection element to a liquid crystal panel 102. Furthermore, liquid crystal equipment 101 is formed by forming a lighting system 106 in the rear-face side of a liquid crystal panel 102 as a back light.
[0105] A liquid crystal panel 102 is formed by sticking 1st substrate 107a and 2nd substrate 107b by the sealant 108. A sealant 108 is formed in the inside front face of 1st substrate 107a or 2nd substrate 107b by carrying out annular adhesion in epoxy system resin of screen-stencil etc. Moreover, inside a sealant 108, as shown in drawing 19 , spherical or the flow material 109 formed in the shape of a cylinder is contained in the state of distribution with a conductive

ingredient.
[0106] In drawing 19 , 1st substrate 107a has transparent glass and tabular base material 111a formed by transparent plastics etc. The reflective film 112 is formed in the inside front face (top front face of drawing 19) of this base material 111a, the laminating of the insulator layer 113 is carried out on it, on it, 1st electrode 114a sees from arrow-head D, it is formed in the shape of a stripe (refer to drawing 18), and orientation film 116a is further formed on it. Moreover, the outside front face (bottom front face of drawing 19) of base material 111a is equipped with polarizing plate 117a by attachment etc.
[0107] Although those stripe spacing is drawn widely actually more sharply and the number of 1st electrode 114a is therefore drawn few in drawing 18 in order to make the array of 1st electrode 114a intelligible, as for 1st electrode 114a, an a large number book is formed more on base material 111a in fact.
[0108] In drawing 19 , 2nd substrate 107b has transparent glass and tabular base material 111b formed by transparent plastics etc. A color filter 118 is formed in the inside front face (bottom front face of drawing 19) of this base material 111b, it sees from arrow-head D in the direction where the above-mentioned 1st electrode 114a and 2nd electrode 114b cross at right angles on it, and is formed in the shape of a stripe (refer to drawing 18), and orientation film 116b is further formed on it. Moreover, the outside front face (top front face of drawing 19) of base material 111b is equipped with polarizing plate 117b by attachment etc.
[0109] Although the twist is also actually drawing those stripe spacing sharply and widely like [in order for drawing 18 to show the array of 2nd electrode 114b intelligibly] the case of 1st electrode 114a and the number of 2nd electrode 114b is therefore drawn few, as for 2nd electrode 114b, an a large number book is formed more on base material 111b in fact.
[0110] In drawing 19 , liquid crystal L, for example, STN (Super Twisted Nematic) liquid crystal, is enclosed in the gap surrounded by 1st substrate 107a, 2nd substrate 107b, and the sealant 108 and the so-called cel gap. Many minute globular form spacers 119 are distributed by the inside front face of 1st substrate 107a or 2nd substrate 107b, and when these spacers 119 exist in a cel gap, the thickness of the cel gap is maintained by homogeneity.
[0111] 1st electrode 114a and 2nd electrode 114b are mutually arranged in rectangular chill, and those crossings are seen from [of drawing 19] arrow-head D, and they arrange them in the shape of a dot matrix. And each crossing of the shape of the dot matrix constitutes one picture element pixel. The color filter 118 is formed by seeing each color element of R (red), G (green), and B (blue) from arrow-head D, and making it arrange by patterns, such as a predetermined pattern, for example, a stripe array, a delta array, and a mosaic array. The one above-mentioned picture element pixel supports every one each of the them R, G, and B, and 3 color picture element pixel of R, G, and B becomes one unit, and 1 pixel is constituted.
[0112] Images, such as an alphabetic character and a figure, are displayed on the outside of 2nd substrate 107b of a liquid crystal panel 102 by making two or more picture element pixels arranged in the shape of a dot matrix, therefore a pixel emit light alternatively. Thus, the field where an image is displayed is an effective pixel field, and the superficial rectangle field displayed by the arrow head V in drawing 18 and drawing 19 is an effective viewing area.
[0113] In drawing 19 , the reflective film 112 is formed with light reflex property ingredients, such as an APC alloy and aluminum (aluminum), and opening 121 is formed in the location corresponding to each picture element pixel which is the intersection of 1st electrode 114a and 2nd electrode 114b. As a result, opening 121 is seen from [of drawing 19] arrow-head D, and is arranged in the shape of [as a picture element pixel / same] a dot matrix.
[0114] 1st electrode 114a and 2nd electrode 114b are formed of ITO (Indium-Tin Oxide) which is for example, transparence electric conduction material. Moreover, the orientation film 116a and 116b is formed by making polyimide system resin adhere in the shape of [of uniform thickness] film. When these orientation film 116a and 116b receives rubbing processing, the initial orientation of the liquid crystal molecule on the front face of 1st substrate 107a and 2nd substrate 107b is determined.
[0115] In drawing 18 , 1st substrate 107a is formed in an area larger than 2nd substrate 107b, and when sticking these substrates by the sealant 108, 1st substrate 107a has substrate

overhang section 107c jutted out to the outside of 2nd substrate 107b. And cash-drawer wiring 114c which prolongs for it and comes out of 1st electrode 114a to this substrate overhang section 107c, 114d of cash-drawer wiring which flows with 2nd electrode 114b on 2nd substrate 107b through the flow material 109 (refer to drawing 19) which exists in the interior of a sealant 108, Various kinds of wiring called 114f of metal wiring connected to the bump for an input of metal wiring 114e connected to the bump for an input, i.e., the terminal for an input, of IC103a for a liquid crystal drive and IC103b for a liquid crystal drive etc. is formed by the suitable pattern.

[0116] With the gestalt of this operation, 114d of cash-drawer wiring energized to cash-drawer wiring 114c and 2nd electrode 114b which are prolonged from 1st electrode 114a is formed by ITO which is the same ingredient as those electrodes, i.e., a conductive oxide. Moreover, the metal wiring 114e and 114f which is wiring of the input side of ICs 103a and 103b for a liquid crystal drive is formed, the low metallic material, for example, the APC alloy, of an electric resistance value. This APC alloy is an alloy which consists of the alloy which accompanies mainly including Ag and contains Pd and Cu, for example, Ag98%, Pd1%, and Cu1%.

[0117] ICs 103a and 103b for a liquid crystal drive are pasted up and mounted in the front face of substrate overhang section 107c by ACF (Anisotropic Conductive Film: anisotropy electric conduction film)122. That is, with the gestalt of this operation, it is formed on the substrate as a liquid crystal panel of the so-called COG (Chip On Glass) method of the structure where a semiconductor chip is mounted directly. In the mounting structure of this COG method, the input-side bump of ICs 103a and 103b for a liquid crystal drive and the metal wiring 114e and 114f are connected conductively, it pulls out with the output side bump of ICs 103a and 103b for a liquid crystal drive, and Wiring 114c and 114d is connected conductively by the electric conduction particle contained inside ACF122.

[0118] In drawing 18 , FPC104 has the flexible resin film 123, the circuit 126 constituted including the chip 124, and the metal wiring terminal 127. A circuit 126 is directly carried in the front face of the resin film 123 by the conductive connection technique of soldering and others. Moreover, the metal wiring terminal 127 is formed with the electrical conducting material of an APC alloy, Cr, and Cu and others. The part in which the metal wiring terminal 127 was formed among FPC104 is connected to the part in which the metal wiring 114e and 114f was formed among 1st substrate 107a by ACF122. And the metal wiring 114e and 114f by the side of a substrate and the metal wiring terminal 127 by the side of FPC flow by work of the electric conduction particle contained inside ACF122.

[0119] The external connection terminal 131 is formed in the side edge of the opposite side of FPC104, and it connects with the external circuit which this external connection terminal 131 does not illustrate. And based on the signal transmitted from this external circuit, ICs 103a and 103b for a liquid crystal drive drive, a scan signal is supplied to either 1st electrode 114a or 2nd electrode 114b, and a data signal is supplied to another side. Armature-voltage control of the picture element pixel of the shape of a dot matrix arranged in the effective viewing area V is carried out for each pixel of every by this, consequently the orientation of liquid crystal L is controlled for each picture element pixel of every.

[0120] In drawing 18 , the lighting system 106 which functions as the so-called back light has the transparent material 132 constituted with acrylic resin etc., the diffusion sheet 133 prepared in optical outgoing radiation side 132b of this transparent material 132, the reflective sheet 134 prepared in the opposite side of optical outgoing radiation side 132b of a transparent material 132, and LED (Light Emitting Diode)136 as a source of luminescence, as shown in drawing 19 .

[0121] LED136 is supported by the LED substrate 137 and the supporter (not shown) formed in a transparent material 132 and one is equipped with the LED substrate 137. By equipping the predetermined location of a supporter with the LED substrate 137, LED136 is put on the location which counters optical incorporation side 132a which is the side side end face of a transparent material 132. In addition, the sign 138 shows the shock absorbing material for buffering the impact which joins a liquid crystal panel 102.

[0122] If LED136 emits light, the light is incorporated from optical incorporation side 132a, and is led to the interior of a transparent material 132, and while spreading reflecting on the wall

surface of the reflective sheet 134 or a transparent material 132, outgoing radiation of it will be carried out from optical outgoing radiation side 132b as a flat-surface light to the exterior through the diffusion sheet 133.
[0123] In drawing 19 , since it is constituted as mentioned above, it reflects by the reflective film 112 and the liquid crystal equipment 101 of the gestalt of this operation is again supplied to liquid crystal L, after an extraneous light is incorporated inside a liquid crystal panel 102 from the 2nd substrate 107b side and the light passes liquid crystal L, when extraneous lights, such as sunlight and indoor light, are bright enough. Orientation control of the liquid crystal L is carried out for every picture element pixel of R, G, and B with the electrodes 114a and 114b which pinch this. Therefore, the light supplied to liquid crystal L is modulated for every picture element pixel, and images, such as an alphabetic character and a figure, are displayed on the exterior of a liquid crystal panel 102 by the light which passes polarizing plate 117b by the modulation, and the light which cannot pass. Thereby, the display of a reflective mold is performed.
[0124] On the other hand, when the quantity of light of an extraneous light is not fully obtained, LED136 emits light, outgoing radiation of the flat-surface light is carried out from optical outgoing radiation side 132b of a transparent material 132, and the light is supplied to liquid crystal L through the opening 121 formed in the reflective film 112. At this time, the supplied light is modulated for every picture element pixel like the display of a reflective mold with the liquid crystal L by which orientation control is carried out. Thereby, an image is displayed on the exterior and the display of a passage mold is performed.
[0125] The liquid crystal equipment 101 of the above-mentioned configuration is manufactured by the manufacture approach shown in drawing 17 . In this manufacture approach, it is the process in which a series of processes of a process P1 - a process P6 form 1st substrate 107a, and is the process in which a series of processes of a process P11 - a process P14 form 2nd substrate 107b. As for the 1st substrate formation process and the 2nd substrate formation process, each is usually performed uniquely.
[0126] First, if the 1st substrate formation process is explained, the reflective film 112 for plurality of a liquid crystal panel 102 will be used for the front face of the mother raw material substrate of the large area formed by translucency glass, translucency plastics, etc., and the photolithography method etc. will be formed in it. Furthermore, an insulator layer 113 is fabricated using the method of forming well-known on it (process P1). Next, 1st electrode 114a, the cash-drawer wiring 114c and 114d, and the metal wiring 114e and 114f are formed using the photolithography method etc. (process P2).
[0127] Then, orientation film 116a is formed by spreading, printing, etc. on 1st electrode 114a (process P3), and the initial orientation of liquid crystal is determined by performing rubbing processing to that orientation film 116a further (process P4). Next, a sealant 108 is annularly formed by screen-stencil etc. (process P5), and the 1st substrate of a mother of the large area which owns two or more panel patterns on 1st substrate 107a of a liquid crystal panel 102 in part is formed of above (process P6) the still more nearly spherical spacer 119 on it is distributed, for example.
[0128] Apart from the above 1st substrate formation process, the 2nd substrate formation process (the process P11 of drawing 17 - process P14) is carried out. First, the mother raw material base material of the large area formed by translucency glass, translucency plastics, etc. is prepared, and the color filter 118 for plurality of a liquid crystal panel 102 is formed in the front face (process P11). The formation process of this color filter 118 is performed using the manufacture approach shown in drawing 6 , and formation of each color filter element of R, G, and B in that manufacture approach is performed according to the control approach of one of the ink jet heads 22 shown in drawing 1 thru/or drawing 4 , etc. using the drop regurgitation equipment 16 of drawing 8 . Since the manufacture approach of these color filters and the control approach of the ink jet head 22 are the same as the already explained contents, those explanation is omitted.
[0129] If a color filter 1 118, i.e., a color filter, is formed on the mother substrate 12, i.e., a mother raw material base material, as shown in drawing 6 (d) next, 2nd electrode 114b will be formed by the photolithography method (process P12). Furthermore, orientation film 116b is

formed of spreading, printing, etc. (process P13). Next, rubbing processing is performed to the orientation film 116b, and the initial orientation of liquid crystal is decided (process P14). Of the above, the 2nd substrate of a mother of the large area which owns two or more panel patterns on 2nd substrate 107b of a liquid crystal panel 102 in part is formed.
[0130] By the above, after the 1st substrate of a mother and the 2nd substrate of a mother of a large area are formed, those mother substrates of each other are stuck [alignment /, i.e., after carrying out alignment,] on both sides of a sealant 108 in between (process P21). Thereby, the panel part for liquid crystal panel plurality is included, and the panel structure of the empty in the condition that liquid crystal is not yet enclosed is formed.
[0131] Next, a scribe slot, i.e., the slot for cutting, is formed in the position of the panel structure of the completed empty, and the panel structure is further taken a break namely, cut on the basis of the scribe slot (process P22). Thereby, the panel structure of the empty of the shape of so-called strip of paper in the condition that the opening 110 (refer to drawing 18) for liquid crystal impregnation of the sealant 108 of each liquid crystal panel part is exposed to the exterior is formed.
[0132] Then, liquid crystal L is poured into the interior of each liquid crystal panel part through the exposed opening 110 for liquid crystal impregnation, and each opening 110 for liquid crystal impregnation is further closed with resin etc. (process P23). The usual liquid crystal impregnation processing puts into a chamber etc. the reservoir container and the strip-of-paper-like empty panel by which liquid crystal was stored into for example, the reservoir container, and the liquid crystal was stored. After making the chamber etc. into a vacua, in the interior of the chamber, a strip-of-paper-like empty panel is immersed into liquid crystal. Then, it is carried out by opening a chamber to atmospheric pressure. Since the interior of an empty panel is a vacua at this time, the liquid crystal pressurized by atmospheric pressure is introduced inside a panel through opening for liquid crystal impregnation. Since liquid crystal adheres to the surroundings of the liquid crystal panel structure after liquid crystal impregnation, the strip-of-paper-like panel after liquid crystal impregnation processing receives washing processing in a process P24.
[0133] Then, a scribe slot is again formed in a predetermined location to the mother panel of the shape of a strip of paper after liquid crystal impregnation and washing finish. Furthermore, a strip-of-paper-like panel is cut on the basis of the scribe slot. Two or more liquid crystal panels 102 are separately cut down by this (process P25). In this way, to each produced liquid crystal panel 102, as shown in drawing 18 , target liquid crystal equipment 101 is completed by mounting ICs 103a and 103b for a liquid crystal drive, equipping with a lighting system 106 as a back light, and connecting FPC104 further (process P26).
[0134] The manufacture approach of the liquid crystal equipment explained above and especially its manufacturing installation have the following descriptions in the phase which manufactures a color filter 1. That is, each filter element 3 in the color filter 1 118, i.e., the color filter of drawing 19 , shown in drawing 5 (a) is not formed of one horizontal scanning X of the ink jet head 22 (refer to drawing 1), and one filter element 3 is formed in every n times of two or more nozzles 27 belonging to a different nozzle group, and is formed in predetermined thickness by receiving the ink regurgitation in piles 4 times. For this reason, even when variation exists in ink discharge quantity among two or more nozzles 27 temporarily, it can prevent that variation arises in thickness among two or more filter elements 3, and, so, the light transmission property of a color filter 1 can be superficially made into homogeneity. In the liquid crystal equipment 101 of drawing 19 , I hear that clear color display without an irregular color is obtained, and there is this.
[0135] Moreover, in the manufacture approach of the liquid crystal equipment of the gestalt this operation, and its manufacturing installation, since a filter element 3 is formed by the ink regurgitation using the ink jet head 22 by using the drop regurgitation equipment 16 shown in drawing 8 , it is not necessary to pass through a complicated process like the approach using the photolithography method and, and an ingredient is not wasted.
[0136] (Explanation about the manufacture approach of the electro-optic device using an EL element, and a manufacturing installation) Drawing 20 shows the gestalt of 1 implementation of the manufacture approach of EL equipment as an example of the electro-optic device concerning this invention. Moreover, drawing 21 shows the main process of the manufacture

approach, and the main cross-section structure of EL equipment finally acquired. As shown in drawing 21 (d), EL equipment 201 forms the pixel electrode 202 on the transparence substrate 204, between each pixel electrode 202, looks at bank 205 from arrow-head G, and forms it in the shape of a grid. The hole-injection layer 220 is formed into those grid-like crevices, and R color luminous layer 203R, G color luminous layer 203G, and B color luminous layer 203B is formed into each grid-like crevice so that it may see from arrow-head G and may become a predetermined array of a stripe array etc. Furthermore, EL equipment 201 is formed by forming a counterelectrode 213 on them.

[0137] When driving the above-mentioned pixel electrode 202 by the active component of 2 terminal molds called a TFD (Thin Film Diode: thin-film diode) component etc., the above-mentioned counterelectrode 213 is seen from arrow-head G, and is formed in the shape of a stripe. Moreover, when driving the pixel electrode 202 by the active component of 3 terminal molds called TFT (Thin Film Transistor: thin film transistor) etc., the above-mentioned counterelectrode 213 is formed as a single field electrode.

[0138] The field across which it faces with each pixel electrode 202 and each counterelectrode 213 becomes one picture element pixel, the picture element pixel of R, G, and B3 color becomes one unit, and one pixel is formed. By controlling the current which flows each picture element pixel, what is wished of two or more picture element pixels is made to emit light alternatively, and, thereby, the full color image wished to have in the direction of arrow-head H can be displayed.

[0139] The above-mentioned EL equipment 201 is manufactured by the manufacture approach shown in drawing 20 . That is, like a process P51 and drawing 21 (a), active elements, such as a TFD component and a TFT component, are formed in the front face of the transparence substrate 204, and the pixel electrode 202 is formed further. As the formation approach, the photolithography method, a vacuum-like arrival method, the sputtering method, the metal fog method, etc. can be used, for example. As an ingredient of the pixel electrode 202, the multiple oxide of ITO (Indium-Tin Oxide), the tin oxide, indium oxide, and a zinc oxide etc. can be used.

[0140] next, it is shown in a process P52 and drawing 21 (a) -- as -- a septum, i.e., the pattern NINGU technique of common knowledge of bank 205, for example, the photolithography method, -- using -- forming -- this bank 205 -- each -- between the transparence pixel electrodes 202 is filled. Thereby, improvement in contrast, prevention of the color mixture of luminescent material, the optical leakage from between a pixel and pixels, etc. can be prevented. Although it will not be limited especially if it has endurance to the solvent of EL luminescent material as an ingredient of bank 205, organic materials, such as that it can Teflon(trademark)-ize by fluorocarbon gas plasma treatment, for example, acrylic resin, an epoxy resin, and photosensitive polyimide, are desirable.

[0141] Next, just before applying the ink for hole-injection layers as a functional liquefied object, continuation plasma treatment of oxygen gas and the fluorocarbon gas plasma is performed to the transparence substrate 204 (process P53). Thereby, a polyimide front face is ******(ed) and an ITO front face can perform wettability control by the side of the substrate for hydrophilization being carried out and carrying out patterning of the drop minutely. As equipment which generates the plasma, it can use similarly with the equipment which generates the plasma in a vacuum, or the equipment which generates the plasma in atmospheric air.

[0142] Next, as shown in a process P54 and drawing 21 (a), patterning spreading is performed for the ink for hole-injection layers on discharge and each pixel electrode 202 from the ink jet head 22 of the drop regurgitation equipment 16 of drawing 8 . One approach of the approaches which showed the concrete control approach of the ink jet head 22 in drawing 1 , drawing 2 , drawing 3 , and drawing 4 is used. A solvent is removed on a room temperature and the conditions of 20 minutes after the spreading and among a vacuum (1torr) (process P55). Then, the ink for luminous layers and the hole-injection layer 220 not dissolving are formed among atmospheric air by 20 degrees C (on a hot plate), and heat treatment for 10 minutes (process P56). On the above-mentioned conditions, thickness was 40nm.

[0143] Next, as shown in a process P57 and drawing 21 (b), the ink jet method is used on the hole-injection layer 220 in each filter-element formation field 7, and the ink for G luminous layers

as an EL luminescent material which is the ink for R luminous layers and the functional liquefied object as an EL luminescent material which are a functional liquefied object is applied. Each ink for luminous layers is made to breathe out also here from the ink jet head 22 of the drop regurgitation equipment 16 of drawing 8 . One approach of the approaches which showed the control approach of the ink jet head 22 in drawing 1 thru/or drawing 4 is used. According to the ink jet method, detailed patterning can be performed in a short time simple. Moreover, it is possible by changing the solid content concentration and discharge quantity of an ink constituent to change thickness.

[0144] A solvent is removed on the conditions of a room temperature, 20 etc. minutes, etc. after spreading of the ink for luminous layers, and among a vacuum (1torr) (process P58). Continuously, among nitrogen-gas-atmosphere mind, it is made to conjugate by 150 degrees C and heat treatment of 4 hours, and R color luminous layer 203R and G color luminous layer 203G are formed (process P59). By the above-mentioned conditions, thickness was 50nm. The luminous layer which conjugated by heat treatment is insoluble to a solvent.

[0145] In addition, before forming a luminous layer, continuation plasma treatment of oxygen gas and the fluorocarbon gas plasma may be performed in the hole-injection layer 220. Thereby, a fluorine ghost layer is formed on the hole-injection layer 220, and when ionization potential becomes high, hole-injection effectiveness can offer increase and organic electroluminescence equipment with high luminous efficiency.

[0146] Next, as shown in a process P60 and drawing 21 (c), B color luminous layer 203B as an EL luminescent material which is a functional liquefied object was formed in piles on R color luminous layer 203R in each picture element pixel, G color luminous layer 203G, and the hole-injection layer 220. Thereby, it not only forms the three primary colors of R, G, and B, but it can bury and carry out flattening of the level difference of R color luminous layer 203R and G color luminous layer 203G, and bank 205. Thereby, vertical inter-electrode short-circuit can be prevented certainly. By adjusting the thickness of B color luminous layer 203B, in the laminated structure of R color luminous layer 203R and G color luminous layer 203G, B color luminous layer 203B acts as an electron injection transportation layer, and does not emit light in B color.

[0147] As the formation approach of the above B color luminous layer 203B, the general spin coat method as a wet method can also be adopted, for example, or R color luminous layer 203R and the method of forming G color luminous layer 203G, and the same ink jet method can also be adopted.

[0148] Then, as shown in a process P61 and drawing 21 (d), target EL equipment 201 is manufactured by forming a counterelectrode 213. A counterelectrode 213 can be formed by being made from Mg, Ag, aluminum, Li, etc. using the forming-membranes methods, such as vacuum deposition and a spatter, when it is a field electrode. Moreover, when a counterelectrode 213 is a stripe-like electrode, the formed electrode layer can be formed using the patterning technique of the photolithography method etc.

[0149] Since one of the control approaches shown in drawing 1 thru/or drawing 4 as the control approach of an ink jet head is adopted according to the manufacture approach of the EL equipment 201 explained above, and its manufacturing installation The hole-injection layer 220 in each picture element pixel in drawing 21 and R and G, and B each color luminous layers 203R, 203G, and 203B It is not formed of one horizontal scanning X of an ink jet head (refer to drawing 1). The hole-injection layer and/or each color luminous layer in one picture element pixel are formed in n times of two or more nozzles 27 belonging to a different nozzle group, and are formed in predetermined thickness by receiving the ink regurgitation in piles 4 times. For this reason, even when variation exists in ink discharge quantity among two or more nozzles 27 temporarily, it can prevent that variation arises in thickness among two or more picture element pixels, and, so, the illuminant cloth property of the luminescence side of EL equipment 201 can be superficially made into homogeneity. In the EL equipment 201 of drawing 21 (d), I hear that clear color display without an irregular color is obtained, and there is this.

[0150] Moreover, in the manufacture approach of EL equipment of the gestalt this operation, and its manufacturing installation, since each color picture element pixel of R, G, and B is formed by the ink regurgitation using the ink jet head 22 by using the drop regurgitation equipment 16

shown in drawing 8 , it is not necessary to pass through a complicated process like the approach using the photolithography method and, and an ingredient is not wasted.
[0151] (Gestalt of the operation about the manufacture approach of a color filter, and a manufacturing installation) Next, the gestalt of operation of the manufacturing installation of the color filter of this invention is explained with reference to a drawing. First, the color filter manufactured is explained in advance of explanation of the manufacturing installation of this color filter. Drawing 33 is the partial enlarged drawing showing a color filter, drawing 33 (A) is a top view and drawing 33 (B) is X-X-ray sectional view of drawing 33 (A). In addition, in the color filter shown in this drawing 33 , the same sign is attached and explained about the same configuration as the color filter 1 of the operation gestalt shown in drawing 5 .
[0152] [Configuration of a color filter] The color filter 1 is equipped with two or more pixel 1A located in a line in the shape of a matrix in drawing 33 (A). The boundary line of these pixel 1A is divided by the septum 6. It is introduced into each of pixel 1A, the color filter ingredient 13, i.e., the filter-element ingredient, as a liquefied object which is one ink of red (R), green (G), and blue (B). Although the color filter shown in this drawing 33 explained arrangement of red, green, and blue as the so-called mosaic array, as mentioned above, it can apply any arrangement of a stripe array, a delta array, etc.
[0153] The color filter 1 is equipped with the substrate 12 of translucency, and the septum 6 of translucency as shown in drawing 33 (B). The part from which this septum 6 was not formed, namely, was removed constitutes the above-mentioned pixel 1A. The filter-element ingredient 13 of each color introduced into this pixel 1A constitutes the filter element 3 used as a coloring layer. The protective coat 4 and the electrode layer 5 which are a protective layer are formed in the top face of a septum 6 and a filter element 3.
[0154] [Configuration of the manufacturing installation of a color filter] Next, the configuration of the manufacturing installation which manufactures the above-mentioned color filter is explained with reference to a drawing. Drawing 22 is the perspective view which cut and lacked the part which shows the drop regurgitation processor of the manufacturing installation of the color filter concerning this invention.
[0155] A color filter manufacturing installation manufactures the color filter 1 which constitutes the electrochromatic display panel as an electro-optic device. This color filter manufacturing installation is equipped with the drop regurgitation equipment which is not illustrated.
[0156] [Configuration of a drop regurgitation processor] And drop regurgitation equipment has three sets of the drop regurgitation processors 405R, 405G, and 405B as shown in drawing 22 like the drop regurgitation equipment of the gestalt of each operation mentioned above. These drop regurgitation processors 405R, 405G, and 405B support three colors of R, G, and B which are, the ink, i.e., the color filter ingredient, as a liquefied object, and which carry out the regurgitation of the filter-element ingredient 13 of R, G, and B, for example to the mother substrate 12, respectively. In addition, these drop regurgitation processors 405R, 405G, and 405B are arranged in the shape of an abbreviation serial, and constitute drop regurgitation equipment. Moreover, the control unit which controls actuation of each configuration member and which is not illustrated is formed in each drop regurgitation processors 405R, 405G, and 405B in one.
[0157] In addition, the carrier robot which carries in and takes out one mother substrate 12 at a time to these drop regurgitation processors 405R, 405G, and 405B and which does not illustrate is connected to each drop regurgitation processors 405R, 405G, and 405B, respectively. Moreover, for example, six-sheet hold is possible for the mother substrate 12 to each drop regurgitation processors 405R, 405G, and 405B, and heat treatment, for example, the multistage BEKU furnace which dries 120 degrees C of filter-element ingredients 13 which heated for 5 minutes and were breathed out and which is not illustrated, is connected to them in the mother substrate 12.
[0158] And each drop regurgitation processors 405R, 405G, and 405B have the thermal clean chamber 422 which is a hollow box-like body case, as shown in drawing 22 . The interior is adjusted to 20**0.5 degrees C, and the inside of this thermal clean chamber 422 is formed impossible [invasion of dust] from the exterior so that stable good drawing by the ink jet method may be obtained. In this thermal clean chamber 422, the body 423 of a drop regurgitation

processor is arranged.
[0159] The body 423 of a drop regurgitation processor has the X-axis air slide table 424 so that it may be shown drawing 22 . On this X-axis air slide table 424, the horizontal-scanning driving gear 425 with which the linear motor which is not illustrated was arranged is arranged. It has the plinth section which carries out attachment immobilization by suction and which is not illustrated, and this horizontal-scanning driving gear 425 moves the mother substrate 12 to a main scanning direction to the mother substrate 12 which is X shaft orientations about this plinth section.
[0160] As shown in the body 423 of a drop regurgitation processor at drawing 22 , it is located above the X-axis air slide table 424, and the vertical-scanning driving gear 427 as a Y-axis table is arranged. This vertical-scanning driving gear 427 moves the filter-element ingredient 13 in the direction of vertical scanning to the mother substrate 12 which is Y shaft orientations about the head unit 420 made to breathe out along the vertical direction. In addition, in drawing 22 , the head unit 420 is displayed with the continuous line in the condition of having floated in the air, in order to clarify physical relationship.
[0161] Moreover, in order to control the location of the ink jet head 421, and the location of the mother substrate 12, the various cameras which are location recognition means to recognize a location and which are not illustrated are arranged by the body 423 of a drop regurgitation processor. In addition, the position control of the head unit 420 or the plinth section is realizable by the control approach of of the feedback control using others and a servo motor and other arbitration. [position control / which used the pulse motor]
[0162] Moreover, as shown in the body 423 of a drop regurgitation processor at drawing 22 , the wiping unit 481 which wipes off the field which carries out the regurgitation of the filter-element ingredient 13 in the head unit 420 is formed. This wiping unit 481 rolls round suitably the end side of the wiping member to which the laminating of for example, a cloth member and the rubber sheet was carried out in one and which is not illustrated, and has composition which carries out wiping of the field which carries out the regurgitation of the filter-element ingredient 13 in respect of being new one by one. This removes the filter-element ingredient adhering to a regurgitation side, and he is trying for the blinding of a nozzle not to happen.
[0163] Furthermore, as shown in the body 423 of a drop regurgitation processor at drawing 22 , the ink system 482 is formed. This ink system 482 has the ink tank 483 which stores the filter-element ingredient 13, the supply pipe 478 with which the filter-element ingredient 13 can circulate, and the pump which supplies the filter-element ingredient 13 to the head unit 420 through a supply pipe 478 from the ink tank 483 and which is not illustrated. In addition, in drawing 22 , piping of a supply pipe 478 is what was shown typically, it is wired at the vertical-scanning driving gear 427 side so that migration of the head unit 420 may not be influenced from the ink tank 483, and it supplies the filter-element ingredient 13 to the head unit 420 from the upper part of the vertical-scanning driving gear 427 which scans the head unit 420.
[0164] Moreover, the gravimetry unit 485 which detects the discharge quantity of the filter-element ingredient 13 breathed out from the head unit 420 is formed in the body 423 of a drop regurgitation processor.
[0165] Furthermore, the pair is arranged for the dot omission detection unit 487 which has the photosensor which is not illustrated and detects the discharge condition of the filter-element ingredient 13 from the head unit 420 by the body 423 of a drop regurgitation processor. This dot omission detection unit 487 is arranged so that the light source and the light sensing portion of a photosensor which are not illustrated along the direction which crosses from the head unit 420 to the direction which a liquefied object makes breathe out, for example, X shaft orientations, may counter across the space through which the drop breathed out from the head unit 420 passes. Moreover, in order to be located and arranged in Y shaft-orientations side which are the conveyance directions of the head unit 420 and to carry out the regurgitation of the filter-element ingredient 13, whenever it carries out vertical-scanning migration of the head unit 420, a discharge condition is detected and a dot omission is detected.
[0166] In addition, although mentioned later in detail, the head equipment 433 which carries out the regurgitation of the filter-element ingredient 13 to the head unit 420 is arranged in two

trains. For this reason, one pair of dot omission detection unit 487 is formed in order to detect a discharge condition for every **** head equipment.
[0167] [Configuration of a head unit] Next, the configuration of the head unit 420 is explained. Drawing 23 is the top view showing the head unit prepared in the drop regurgitation processor. Drawing 24 is the side elevation showing a head unit. Drawing 25 is the front view showing a head unit. Drawing 26 is the sectional view showing a head unit.
[0168] The head unit 420 has the head body section 430 and the ink feed zone 431, as shown in drawing 23 thru/or drawing 26 . Moreover, the head body section 430 has head equipment 433 of an abbreviation same configuration on the real target attached to the plate-like carriage 426 and this carriage 426 two or more picking.
[0169] (Configuration of head equipment) Drawing 27 is the decomposition perspective view showing the head equipment arranged in the head unit.
[0170] Head equipment 433 has the strip-of-paper-like printed circuit board 435, as shown in drawing 27 . The various electrical parts 436 are mounted in this printed circuit board 435, and electric wiring is prepared in it. Moreover, it is located in the end side (drawing 27 Nakamigi side) of a longitudinal direction, and penetration formation of the window part 437 is carried out at the printed circuit board 435. Furthermore, the circulation way 438 where the filter-element ingredient 13 which is ink can circulate is located in the both sides of a window part 437, and is established in the printed circuit board 435.
[0171] And it is located in the abbreviation end side (drawing 27 Nakamigi side) of a longitudinal direction, and the ink jet head 421 is attached in the whole surface side (drawing 27 Nakashita side side) of this printed circuit board 435 in one by the attachment member 440. This ink jet head 421 is formed in the shape of a longitudinal rectangle, and is attached in the condition that a longitudinal direction meets the longitudinal direction of a printed circuit board 435. In addition, each ink jet head 421 in each head equipment 433 is the product of an abbreviation same configuration, i.e., predetermined specification, substantially, and should just be sorted out by predetermined quality. Since it becomes efficient and assembly precision also increases in case these ink jet head 421 specifically has the nozzle which the same number mentions later and that the formation location of a nozzle is mutually the same assembles the ink jet head 421 to carriage 426, it is desirable. Furthermore, if the product made by passing like the same manufacture and erector is used, the need of making a special product is lost and it can consider as low cost.
[0172] Moreover, on the other hand, the connector 441 of a printed circuit board 435 which is located in the abbreviation other end side (left-hand side in drawing 27) of a longitudinal direction, and is electrically connected to the ink jet head 421 in electric wiring is attached in the side (drawing 27 Nakagami side side) in one. As typically shown in drawing 22 , the electric wiring 442 (power-source wiring and signal wiring are included) wired by the vertical-scanning driving gear 427 so that migration of the head unit 420 might not be influenced is connected to these connectors 441. This electric wiring 442 connects the head unit 420 with the control unit which is not illustrated. That is, as the arrow head of a two-dot chain line shows to drawing 23 and drawing 26 typically, it wires from the vertical-scanning driving gear 427 at the periphery side of the head unit 420 which are the both sides of the array direction of the head equipment 433 of two trains of the head unit 420, and connects with a connector 441, and an electric noise produces these electric wiring 442.
[0173] furthermore, the printed circuit board 435 -- on the other hand, the ink induction 443 is attached in the side (drawing 27 Nakagami side side) by the abbreviation end side (drawing 27 Nakamigi side) of a longitudinal direction corresponding to the ink jet head 421. This ink induction 443 has the approximately cylindrical positioning cylinder part 445 which fits in the gage pin section 444 which is prepared in the attachment member 440 and penetrates a printed circuit board 435, and the stop claw part 446 which stops to a printed circuit board 435.
[0174] Moreover, the pair protrusion of the approximately cylindrical connection section 448 of a tip tapering configuration is carried out at the ink induction 443. the end face section which these connection section 448 turns into a printed circuit board 435 side -- the circulation way 438 of a printed circuit board 435 -- **** -- it has opening which is densely open for free

passage and which is not illustrated, and has in the point the hole with which the filter-element ingredient 13 can circulate and which is not illustrated.
[0175] Furthermore, as shown in drawing 24 thru/or drawing 27 , it is located in a tip side and the seal connection section 450 is attached in these connection section 448, respectively. these seal connection section 450 -- an inner circumference side -- the connection section 448 -- **** -- it attaches densely -- it is formed approximately cylindrical and the seal member 449 is formed in the point.
[0176] (Configuration of an ink jet head) Drawing 28 is the decomposition perspective view showing an ink jet head. Drawing 29 is the mimetic diagram which explains the actuation which carries out the regurgitation of the filter-element ingredient of an ink jet head corresponding to the cross section of an ink jet head, and the condition before drawing 29 (A) carries out the regurgitation of the filter-element ingredient, the condition which drawing 29 (B) makes contract a piezoelectric transducer, and is breathing out the filter-element ingredient, and drawing 29 (C) are in the condition immediately after breathing out a filter-element ingredient. Drawing 30 is an explanatory view explaining the discharge quantity of the filter-element ingredient in an ink jet head. Drawing 31 is a rough mimetic diagram explaining the arrangement condition of an ink jet head. Drawing 32 is a partial enlarged drawing in drawing 31 .
[0177] The ink jet head 421 has the abbreviation rectangle-like holder 451, as shown in drawing 28 . This holder 451 is met at a longitudinal direction, for example, the piezoelectric transducers 452, such as 180 piezo-electric elements, are 2 successive-installation eclipse ******. Moreover, it is open for free passage on the circulation way 438 of a printed circuit board 435, and the through tube 453 to which the filter-element ingredient 13 which is ink circulates is formed in the center of both-sides abbreviation of a longitudinal direction at the holder 451, respectively.
[0178] Moreover, as shown in drawing 28 , the elastic plate 455 formed in the shape of a sheet with synthetic resin is formed in the top face which is the whole surface in which the piezoelectric transducer 452 of a holder 451 is located in one. The free passage hole 456 which follows a through tube 453 is formed in this elastic plate 455, respectively. And the engagement hole 458 which engages with the positioning claw part 457 which protruded on the top-face abbreviation four corners of a holder 451 is formed in an elastic plate 455, and it is positioned on the top face of a holder 451, and is attached in it in one.
[0179] Furthermore, the plate-like passage formation plate 460 is formed in the top face of an elastic plate 455. The opening 462 which was prepared in the longitudinal direction of a holder 451 in the shape of [180] a serial, and was prepared [the 1 side of 2 successive-installation ******** nozzle slot 461 and the nozzle slot 461] crosswise [of a holder 451] in the shape of straight side by the shape of straight side at the longitudinal direction of a holder corresponding to the piezoelectric transducer 452, and the circulation hole 463 which follows the free passage hole 456 of an elastic plate 455 are formed in this passage formation plate 460. And the engagement hole 458 which engages with the positioning claw part 457 which protruded on the top-face abbreviation four corners of a holder 451 is formed in an elastic plate 455, and it is positioned with an elastic plate 455 and attached in the top face of a holder 451 in one.
[0180] Moreover, the abbreviation plate-like nozzle plate 465 is formed in the top face of the passage formation plate 460. It corresponds to this nozzle plate 465 in the nozzle slot 461 of the passage formation plate 460, and the nozzle 466 of an approximate circle form is [longitudinal direction / of a holder 451] 2 successive-installation eclipse ****** at the shape of a serial to the die-length range of 25.4mm (1 inch) in 180 pieces. Moreover, the engagement hole 458 which engages with the positioning claw part 457 which protruded on the top-face abbreviation four corners of a holder 451 is formed in a nozzle plate 465, and it is positioned with an elastic plate 455 and the passage formation plate 460, and is attached in the top face of a holder 451 in one.
[0181] And as typically shown in drawing 29 , while partition formation of the liquid reservoir 467 is carried out by the opening 462 of the passage formation plate 460 by the elastic plate 455, the passage formation plate 460, and nozzle plate 465 which carry out a laminating, this liquid reservoir 467 follows each nozzle slot 461 through the liquid supply way 468 by them. By this, the pressure in the nozzle slot 461 increases by actuation of a piezoelectric transducer 452, and

the ink jet head 421 carries out the regurgitation of the filter-element ingredient 13 from a nozzle at 7**2 m/s in the amount of drops of 2-13pl, for example, about 10 pl(s). That is, the filter-element ingredient 13 which is ink is pressurized by making a piezoelectric transducer 452 expand and contract in the direction of arrow-head Q suitably by impressing the predetermined applied voltage Vh in the shape of a pulse to a piezoelectric transducer 452, as it is shown in drawing 29 (A), (B), and (C) one by one, and it is made to breathe out from a nozzle 466 by the drop 8 of the specified quantity, as shown in drawing 29 .

[0182] Moreover, this ink jet head 421 has the variation in the discharge quantity whose discharge quantity by the side of the both ends of the array direction as shown in drawing 30 increases, as the gestalt of the above-mentioned implementation also explained. It is controlled not to carry out the regurgitation of the filter-element ingredient 13 from the nozzle 466 466 of the range where discharge quantity variation becomes less than 5% from this, for example, i.e., every ten nozzles of both ends.

[0183] And head equipment 433 with the ink jet head 421 is arranged together with two or more each other, and the head body section 430 which constitutes the head unit 420 is constituted, as shown in drawing 22 thru/or drawing 26 . The arrangement in the carriage 426 of this head equipment 433 is in the condition arranged while offsetting in the direction which inclined to X shaft-orientations side which are main scanning directions which intersect perpendicularly with Y shaft orientations rather than Y shaft orientations which are the directions of vertical scanning, as typically shown in drawing 31 . That is, from Y shaft orientations which are the directions of vertical scanning, six pieces are put in order in the direction which inclined a little, it is arranged in it, for example, and this train is arranged in two or more trains, for example, two trains. The width of face of the direction of a shorter side of head equipment 433 is wider than the ink jet head 421, and while this cannot narrow arrangement spacing of ink jet head 421 comrades which adjoin mutually, it is the method of the arrangement considered from the situation that the train of a nozzle 466 follows Y shaft orientations, and must be made to be arranged.

[0184] Furthermore, the head body section 430 is in the condition that head equipment 433 inclines in the direction in which the longitudinal direction of the ink jet head 421 crosses to X shaft orientations, and the connector 441 is arranged by abbreviation point symmetry in the condition of being located in the phase opposite direction and the opposite side. As for the arrangement condition that this head equipment 433 inclines, the 57.1 degrees of the arrangement directions of the nozzle 466 which is the longitudinal direction of the ink jet head 421 incline to X shaft orientations.

[0185] moreover, head equipment 433 -- abbreviation -- it is arranged so that it may not be located in a juxtaposition condition to alternate, i.e., the array direction. That is, as shown in drawing 23 thru/or drawing 26 , and drawing 31 , the ink jet head 421 is arranged by two trains, and is arranged by turns [with the alternate array sequence to the Y shaft orientations] so that the nozzle 466 of 12 ink jet heads 421 may follow Y shaft orientations and may be arranged.

[0186] Specifically based on drawing 31 and drawing 32 , it explains to a detail more. Here, the array direction of a nozzle 466 whose ink jet head 421 is a longitudinal direction inclines to X shaft orientations. For this reason, in the single-tier eye of the nozzle 466 of two trains prepared in the ink jet head 421, another side of the nozzle 466 of eye two trains has the field A used as the location of less than ten pieces which does not carry out the regurgitation on the straight line of X shaft orientations in which the 11th nozzle 466 which carries out the regurgitation of the filter-element ingredient 13 is located (A in drawing 32). That is, with one ink jet head 421, the field A where two nozzles 466 do not exist on the straight line in X shaft orientations is generated.

[0187] Therefore, as shown in drawing 31 and drawing 32 , in the field B (B in drawing 32) in which two nozzles 466 are located on the straight line of X shaft orientations with one ink jet head 421, the head equipment 433 which makes a train is not located in a juxtaposition condition by X shaft orientations. Furthermore, the field A where only one piece is located on the straight line in X shaft orientations of the head equipment 433 which makes one train With the field A where only one piece is located on the straight line in X shaft orientations of the head equipment 433 which makes the train of another side It considers as the condition that make it mutually

located in a juxtaposition condition by X shaft orientations, and two nozzles 466 are located in total on the straight line of X shaft orientations with the ink jet head 421 of one train, and the ink jet head 421 of the train of another side. that is, in the field in which the ink jet head 421 is arranged, a total of two nozzles 466 are surely located on the straight line of X shaft orientations in every location -- as -- two trains -- being alternate (alternate) -- it arranges. In addition, the field X of the nozzle 466 which does not carry out the regurgitation of the filter-element ingredient 13 is not counted as the number of two nozzles 466 on the straight line of these X shaft orientations.

[0188] Thus, ink will be breathed out by one part from this two nozzle so that two pieces may be located on a straight line and the nozzle 466 which carries out the regurgitation of the ink to X shaft orientations by which horizontal scanning is carried out may state orally. If one element is constituted only from regurgitation from one nozzle, since the variation in the discharge quantity between nozzles will lead to the property variation of an element, or yield degradation, if one element is formed by the regurgitation from a nozzle separate in this way, the variation in the regurgitation between nozzles can be distributed and equalization and the improvement in the yield in a property between elements can be aimed at.

[0189] (Configuration of an ink feed zone) The ink feed zone 431 has the plate-like tie-down plate 471 of the pair prepared corresponding to two trains of the head body section 430, respectively, and the supply body section 472 attached to these tie-down plates 471 two or more picking, as shown in drawing 23 thru/or drawing 26 . And the supply body section 472 has the **** ellipse tubed attitude section 474. This attitude section 474 is attached movable in accordance with shaft orientations in the condition of penetrating a tie-down plate 471, with the attachment fixture 473. Moreover, the attitude section 474 of the supply body section 472 is energized in the direction to which it advances towards head equipment 433 from a tie-down plate 471 by a coil spring 475 etc., and is attached. In addition, in drawing 23 , on account of explanation, the ink feed zone 431 is illustrated only to one train of the head equipment 433 of two trains, and another side is omitting and illustrating it.

[0190] The flange 476 is formed in the edge of the side which counters the head equipment 433 of this attitude section 474. this flange 476 -- the periphery edge of the attitude section 474 -- a collar -- a ** -- a projection and an end face -- the seal member 449 of the ink induction 443 of head equipment 433 -- energization of a coil spring 475 -- resisting -- **** -- it contacts densely. Moreover, the joint section 477 is formed in the edge of the opposite side the side in which the flange 476 of the attitude section 474 was formed. As this joint section 477 is typically shown in drawing 22, the end of the supply pipe 478 with which the filter-element ingredient 13 circulates is connected.

[0191] As are mentioned above, and typically shown in drawing 22, this supply pipe 478 As the vertical-scanning driving gear 427 wires so that migration of the head unit 420 may not be influenced, and the arrow head of an alternate long and short dash line shows to drawing 23 and drawing 25 typically It is piped from the vertical-scanning driving gear 427 in the center of abbreviation between the ink feed zones 431 arranged in two trains from the head unit 420 upper part, and is further piped by the radial, and it connects with the joint section 477 of the ink feed zone 431, and a tip is piped.

[0192] And the ink feed zone 431 supplies the filter-element ingredient 13 which circulates through a supply pipe to the ink induction 443 of head equipment 433. Moreover, the filter-element ingredient 13 supplied to the ink induction 443 is suitably breathed out in the shape of drop 8 from each nozzle 466 of the ink jet head 421 by which electric control was supplied and carried out to the ink jet head 421.

[0193] [Manufacture actuation of a color filter]

(Pretreatment) Next, the actuation which forms a color filter 1 using the color filter manufacturing installation of the gestalt of the above-mentioned implementation is explained with reference to a drawing. Drawing 34 is a production process sectional view explaining the procedure of manufacturing a color filter 1 using the manufacturing installation of the above-mentioned color filter. [0194] First, a thickness dimension washes the front face of the mother substrate 12 which is a transparence substrate of the alkali free glass 38cm and whose form

width are 30cm by the penetrant remover to which 0.7mm and a vertical dimension did 1 mass % addition of hydrogen peroxide solution at heat concentrated sulfuric acid, for example. After this washing, a rinse is carried out, it air-dries with pure water, and a clean surface is acquired. The chromium film is formed in the front face of this mother substrate 12 by an average of 0.2-micrometer thickness by the spatter, and metal layer 6a is obtained (the order S1 of the drawing 34 metacarpus).

[0195] The photoresist layer which does not illustrate this mother substrate 12 for example, with a spin coat on the front face of metal layer 6a after making it dry for 5 minutes at 80 degrees C on a hot plate is formed. The mask film which drew the necessary matrix pattern configuration and which is not illustrated is stuck on the front face of this mother substrate 12, and it exposes by ultraviolet rays. Next, this exposed mother substrate 12 is immersed in the alkali developer which contains a potassium hydroxide at a rate of 8 mass %, the photoresist of an unexposed part is removed, and patterning of the resist layer is carried out. Then, etching removal of the exposed metal layer 6a is carried out with the etching reagent which uses a hydrochloric acid as a principal component. Thus, protection-from-light layer 6b which has a predetermined matrix pattern and which is a black matrix is obtained (the order S2 of the drawing 34 metacarpus). In addition, the thickness of protection-from-light layer 6b is 0.2 micrometers about, and the width-of-face dimension of protection-from-light layer 6b is 22 micrometers about.

[0196] On the mother substrate 12 with which this protection-from-light layer 6b was prepared, spreading formation of the photopolymer constituent 6c of further the transparence acrylic of a negative mold is carried out with a spin coat method (the order S3 of the drawing 34 metacarpus). After carrying out prebake of the mother substrate 12 which prepared this photopolymer constituent 6c for 20 minutes at 100 degrees C, ultraviolet-rays exposure is carried out using the mask film which drew the predetermined matrix pattern configuration and which is not illustrated. And spin desiccation is carried out, after it develops the resin of an unexposed part with an alkaline developer which was mentioned above, for example and it carries out a rinse with pure water. After-bake as the last desiccation is carried out for 30 minutes at 200 degrees C, a resin part is fully stiffened, and 6d of bank layers is formed. On an average, the thickness of 6d of this bank layer is about 2.7 micrometers, and a width-of-face dimension is about 14 micrometers. A septum 6 is formed in 6d of this bank layer, and protection-from-light layer 6b (order S4 of the drawing 34 metacarpus).

[0197] In order to improve the ink wettability of the filter-element formation field 7 (especially exposure of the mother substrate 12) which is a coloring stratification field divided in obtained protection-from-light layer 6b and 6d of bank layers the account of a top, dry etching, i.e., plasma treatment, is carried out. The bottom of the etching spot which specifically impressed the high voltage to the mixed gas which added oxygen to helium 20%, formed in the etching spot by plasma treatment, and formed the mother substrate 12 is passed, it etches, and the head end process of the mother substrate 12 is carried out.

[0198] (Regurgitation of a filter-element ingredient) next, the inside of the filter-element formation field 7 divided and formed by the septum 6 of the mother substrate 12 with which above-mentioned pretreatment was carried out -- red (R) -- green -- (G) and each blue (B) filter-element ingredient -- an ink jet method -- installation -- that is, the regurgitation is carried out (the order S5 of the drawing 34 metacarpus).

[0199] On the occasion of the regurgitation of the filter-element ingredient by this ink jet method, assembly formation of the head unit 420 is carried out beforehand. And in each drop regurgitation processors 405R, 405G, and 405B of drop regurgitation equipment, it adjusts so that the discharge quantity of the filter-element ingredient 13 breathed out from one nozzle 466 of each ink jet head 421 may turn into the specified quantity, for example, 10pl extent. On the other hand, the septum 6 is beforehand formed in the whole surface of the mother substrate 12 at the grid-like pattern.

[0200] And with the carrier robot which does not illustrate, the mother substrate 12 pretreated as mentioned above is first carried in in drop regurgitation processor 405R for R colors, and is laid on the plinth section in drop regurgitation processor 405R. Positioning immobilization of the mother substrate 12 laid on this plinth section is carried out by suction. And the location of the

mother substrate 12 is checked with various cameras etc., the horizontal-scanning driving gear 425 is controlled and the plinth section holding the mother substrate 12 moves so that it may become a position suitably. Moreover, the head unit 420 is suitably moved with the vertical-scanning driving gear 427, and the location is recognized. Then, the head unit 420 is moved in the direction of vertical scanning, and the discharge condition from a nozzle 466 is detected, and it recognizes having not produced the poor regurgitation, and is made to move to an initial valve position in the dot omission detection unit 487.
[0201] Then, scanning the mother substrate 12 held at the plinth section by which movable is carried out with the horizontal-scanning driving gear 425 in the direction of X, and moving the head unit 420 relatively to the mother substrate 12, the filter-element ingredient 13 is made to breathe out suitably from the predetermined nozzle 466 of the ink jet head 421, and it is filled up in the crevice divided by the septum 6 of the mother substrate 12. From the nozzle 466 of every ten predetermined fields X, for example, both ends, located in the both ends of the arrangement direction of the nozzle 466 shown in drawing 32 with the control unit which the regurgitation from this nozzle 466 does not illustrate, the filter-element ingredient 13 carries out control which is not made to breathe out, and discharge quantity makes it breathe out from 160 uniform pieces located in an interstitial segment in comparison.
[0202] Moreover, since two nozzles 466 are located on the straight line of a scanning direction, i.e., a scan line, and the regurgitation from a nozzle 466 makes a part for 2 dots of two drops breathe out as 1 dot from one nozzle 466 in more detail from one nozzle 466 during migration in one crevice, a total of eight drops are breathed out. It checks whether for this 1 scan migration of every, from the dot omission detection unit 487, a discharge condition is detected and the dot omission has arisen.
[0203] When not recognizing a dot omission, the specified quantity migration of the head unit 420 is made to carry out in the direction of vertical scanning, the actuation which makes the filter-element ingredient 13 breathe out is repeated, moving the plinth section which holds the mother substrate 12 again to a main scanning direction, and a filter element 3 is formed in the predetermined filter-element formation field 7 of the predetermined color filter formation field 11.

[0204] (Desiccation and hardening) And the mother substrate 12 with which the filter-element ingredient 13 of R color was breathed out is taken from drop regurgitation processor 405R with the carrier robot which does not illustrate, and is taken out, and the filter-element ingredient 13 is dried for 5 minutes at 120 degrees C at the multistage BEKU furnace which is not illustrated. It conveys beginning to take the mother substrate 12 from a multistage BEKU furnace with a carrier robot after this desiccation, and cooling. Then, it conveys from drop regurgitation processor 405R one by one to drop regurgitation processor 405B for drop regurgitation processor 405G and B colors for G colors, and the regurgitation of the filter-element ingredient 13 of G color and B color is carried out to the predetermined filter-element formation field 7 one by one like the case of formation of R color. And the mother substrates 12 with which the filter-element ingredient 13 of three colors each was breathed out and dried are collected, and solidification fixing of heat treatment 13, i.e., the filter-element ingredient, is carried out with heating (the order S6 of the drawing 34 metacarpus).
[0205] (Formation of a color filter) A protective coat 4 is formed after this all over the abbreviation for the mother substrate 12 with which the filter element 3 was formed. Furthermore, the electrode layer 5 is formed in the top face of this protective coat 4 by the necessary pattern in ITO (Indium-Tin Oxide). Then, it cuts every color filter formation field 11 separately, and two or more color filters 1 are cut down and formed (the order S7 of the drawing 34 metacarpus). The substrate with which this color filter 1 was formed is used as one side of the substrate of the pair in liquid crystal equipment as shown in drawing 18, as previously explained in the operation gestalt.
[0206] [Effectiveness of the manufacturing installation of a color filter] According to the gestalt of operation shown in this drawing 22 thru/or drawing 34, in addition to the operation effectiveness of the gestalt of each operation explained previously, the operation effectiveness taken below is done so.

[0207] As a liquefied object with a fluidity, namely, for example, the ink jet head 421 with which two or more nozzles 466 which make a drop the filter-element ingredient 13 which is ink, and carry out the regurgitation were arranged and formed in the whole surface It is made to move relatively along the front face of the mother substrate 12 in the condition that the whole surface in which the nozzle 466 of these ink jet head 421 was formed counters the front face of the mother substrate 12 as discharged substance-ed through a predetermined gap. For example on the front face of the nozzle 466 which is located in the predetermined field of the both ends of the arrangement direction of these nozzles 466 among each nozzle 466 of the ink jet head 421 and which is located in interstitial segments other than a predetermined field, without making it breathe out from the nozzle 466 of ten both sides to the mother substrate 12 The regurgitation of the filter-element ingredient 13 is carried out. A drop is not made to breathe out from the nozzle 466 of every ten both ends which are the predetermined fields XX located in the both ends of the arrangement direction of a nozzle 466 where especially discharge quantity increases by this configuration. Since discharge quantity makes the filter-element ingredient 13 breathe out using the nozzle 466 of a comparatively uniform interstitial segment The regurgitation can be superficially carried out to homogeneity on the front face of the mother substrate 12, the color filter 1 with uniform quality is obtained superficially, and a good display is obtained with the display which is an electro-optic device using this color filter 1.

[0208] And since it is not made to breathe out, even when using the functional liquefied objects for [which contained the filter-element ingredient 13 of a color filter 1, EL luminescent material, and a charged particle especially] electrophoresis apparatus as a liquefied object, variation does not arise in a property but a property good as electro-optic devices, such as liquid crystal equipment and EL equipment, can be certainly acquired from the nozzle 466 which serves as many [ten percent or more] discharge quantity from the average of the discharge quantity of the filter-element ingredient 13.

[0209] Moreover, since the filter-element ingredient 13 is breathed out from each nozzle 466 within **ten percent to the average of discharge quantity, discharge quantity becomes comparatively uniform, it is superficially breathed out by homogeneity on the front face of the mother substrate 12, and the electro-optic device of a good property is obtained.

[0210] As a liquefied object with a fluidity, moreover, for example, two or more ink jet heads 421 which two or more nozzles 466 which carry out the regurgitation of the filter-element ingredient 13 which is ink are formed in the whole surface, and put in order and by which they have been arranged In the condition that the whole surface in which the nozzle 466 of these ink jet head 421 was formed counters the front face of the mother substrate 12 which is discharged substance-ed through a predetermined gap It is made to move relatively along the front face of the mother substrate 12, and the same filter-element ingredient 13 is made to breathe out on the front face of the mother substrate 12 from each nozzle 466 of two or more ink jet heads 421. For this reason, substantially, for example using the ink jet head 421 of the same standard item, a thing which have the same number of nozzles and which is made for the large range of the mother substrate 12 to breathe out the filter-element ingredient 13 can become possible, and it can substitute using two or more conventional standard items, without using the special ink jet head of straight side (long dimension), and cost can be reduced.

[0211] Moreover, it can substitute using two or more conventional standard items, without using the special ink jet head of straight side (long picture), and cost can be reduced. Since the manufacture yield falls extremely, the ink jet head with a long dimension will become expensive components, but since the ink jet head of a short dimension has a good manufacture yield compared with it, since it only arranges so that it may become the ink jet head of substantial straight side, using this two or more, by this invention, cost can be reduced sharply. furthermore -- for example, by setting up suitably the number and spacing (the nozzle -- one piece -- or it being used for setting some and it also being able to adjust in the pitch of a pixel) of a nozzle which are used for the orientation which puts in order and arranges the ink-jet head 421, a number, and the regurgitation, it becomes possible to make it correspond to the field which carries out the regurgitation of the filter-element ingredient 13 also to the color filter with which size and the pitch of a pixel differed from the array, and versatility can improve. Moreover, since

the carriage which holds an ink jet head train and this since it arranges and arranges in the direction which an ink jet head is made to incline and crosses to a main scanning direction again is not enlarged, it is not necessary to also make the whole equipment of drop regurgitation equipment enlarge.
[0212] And by [so that it may have the number of the same nozzles as two or more ink jet heads 421 / which use the thing of the same configuration substantially], also with one kind of ink jet head 421, it becomes possible to make a liquefied object correspond to the field which carries out the regurgitation by making it arrange suitably, a configuration is simplified, manufacturability can be improved and cost can also be reduced.
[0213] Moreover, drawing a configuration with predetermined regularity can do easily for example, a stripe mold, mosaicism, a delta mold, etc. by using the ink jet head 421 which the nozzle 466 arranged on the straight line at intervals of abbreviation etc.
[0214] And so that it may meet in the direction of the condition of having inclined, in which the arrangement direction on the abbreviation straight line of a nozzle 466 crosses to the main scanning direction to which it is relatively moved along the front face of the mother substrate 12 Since two or more ink jet heads 421 are relatively moved along the front face of the mother substrate 12, the array direction of the nozzle 466 of two or more ink jet heads 421 will be in the condition of inclining to the main scanning direction which is a direction to which it is moved along the front face of the mother substrate 12. For this reason, when the mother substrate 12 with which the pitch which is spacing by which the filter-element ingredient 13 is breathed out became narrower than the pitch between nozzles, for example, the filter-element ingredient 13 was breathed out is used for the display which are electro-optic devices, such as a liquid crystal panel, a more detailed display gestalt is acquired and a good display can be obtained. Furthermore, it becomes possible to prevent interference of the adjacent ink jet head 421, and a miniaturization can be attained easily. And by setting up this tilt angle suitably, the dot pitch of drawing is set up suitably and can improve versatility. Furthermore, since it will be in the condition that did not make the whole carriage 426 incline but each ink jet head 421 inclined, respectively, the distance to the nozzle 466 of the side near the mother substrate 12 and the nozzle 466 of a side far from the mother substrate 12 becomes small compared with the case where the whole carriage 426 is made to incline, and the time amount which is the migration which met the mother substrate 12 with carriage 426 and to scan can be shortened.
[0215] Furthermore, in the configuration of the ink jet head 421 by which the nozzle 466 was arranged on the straight line at intervals of abbreviation etc., since the nozzle 466 was formed on the straight line at intervals of abbreviation etc. along with the longitudinal direction at the longitudinal rectangle-like ink jet head 421, interference with ink jet head 421 comrades and other parts which the ink jet head 421 is miniaturized, for example, adjoin can be prevented, and it can miniaturize easily.
[0216] Moreover, since the arrangement direction of a nozzle 466 arranged in carriage 426 two or more ink jet heads 421 in the condition of becoming abbreviation parallel, respectively and constituted the head unit 420, two or more regurgitation fields of the same liquefied object can be easily formed in one field, without using the special ink jet head of straight side. Furthermore, it can become possible to make the filter-element ingredient 13 breathe out in piles from an ink jet head 421 which is different in one part, the discharge quantity in a regurgitation field can be equalized easily, and stable good drawing can be obtained.
[0217] And since it has arranged and arranged in the different direction from the longitudinal direction of the ink jet head 421 so that two or more ink jet heads 421 may be made to incline in the direction which crosses to a main scanning direction, respectively and the arrangement direction of all nozzles may become parallel mutually, a regurgitation field can be expanded easily, without manufacturing and using the special ink jet head which has a long dimension. Furthermore, when the mother substrate 12 with which the pitch which be spacing by which the filter-element ingredient 13 be breathe out became narrower than the pitch which it be between nozzles 466, for example, the filter-element ingredient 13 be breathed out be use for a display etc., without the adjacent ink-jet head 421 interfere as mention above by consider as the condition incline in the direction in which the array direction of a nozzle 466 cross to a scanning

direction, a more detailed display gestalt be acquire. And by setting up this tilt angle suitably, the dot pitch of drawing is set up suitably and can improve versatility.
[0218] moreover, two or more ink jet heads 421 -- two or more trains, for example, two trains, -- abbreviation -- being alternate (alternate condition) -- the field where the filter-element ingredient 13 is not breathed out between the ink jet heads 421, without the adjacent ink jet head 421 interfering even if it uses the ink jet head 421 of a ready-made article, without using the special ink jet head 421 of straight side since it has arranged is not produced, and the good regurgitation of the continuous filter-element ingredient 13, i.e., continuous drawing, is made.
[0219] And the ink jet head 421 with which two or more nozzles 466 which carry out the regurgitation of the filter-element ingredient 13 which is a liquefied object with a fluidity, and which is ink, for example were formed in the whole surface It is made to move relatively along the front face of the mother substrate 12 in the condition that the whole surface in which the nozzle 466 of the ink jet head 421 was formed counters the front face of the mother substrate 12 as discharged substance-ed through a predetermined gap. The filter-element ingredient 13 is made to breathe out from the plurality 466 located on the straight line which met in this relative migration direction, for example, two nozzles. For this reason, even when the configuration which carries out the regurgitation of the filter-element ingredient 13 in piles is obtained from two different nozzles 466 and variation exists in discharge quantity among two or more nozzles 466 temporarily, the discharge quantity of the breathed-out filter-element ingredient 13 is equalized, variation can be prevented, the uniform regurgitation is obtained superficially, and the electro-optic device of the uniform good property of quality can be obtained superficially.
[0220] Furthermore, since the dot omission detection unit 487 is formed and the regurgitation of the filter-element ingredient 13 from a nozzle 466 is detected, the regurgitation unevenness of the filter-element ingredient 13 can be prevented, and drawing which is the regurgitation of a certain and good liquefied object can be obtained.
[0221] And a photosensor is formed in the dot omission detection unit 487, and since passage of the filter-element ingredient 13 is detected towards crossing to the discharge direction of the filter-element ingredient 13 with this photosensor, drawing which carries out the regurgitation of the filter-element ingredient 13 and which the discharge condition of the positive filter-element ingredient 13 can be recognized with an easy configuration, and the regurgitation unevenness of the filter-element ingredient 13 can be prevented, and is the regurgitation of the certain and good filter-element ingredient 13 even when it is in process can be obtained.
[0222] Furthermore, before and behind the process which carries out the regurgitation of the filter-element ingredient 13 to the mother substrate 12 from a nozzle 466, since the dot omission detection unit 487 detects the regurgitation of the regurgitation of the filter-element ingredient 13, the discharge condition of in front of the regurgitation of the regurgitation of the filter-element ingredient 13 and an immediately after can be detected, the discharge condition of the regurgitation of the filter-element ingredient 13 can be recognized certainly, a dot omission can be prevented certainly, and good drawing can be obtained. In addition, it is good to even carry out at one time of the back before a configuration of carrying out the regurgitation.
[0223] Moreover, since the dot omission detection unit 487 is arranged in the method opposite side of horizontal scanning of the head unit 420, the distance to which the head unit 420 is moved for detection of the discharge condition of the regurgitation of the filter-element ingredient 13 is short, and is made with the easy configuration which makes migration to the main scanning direction for the regurgitation continue as it is, and can perform detection of a dot omission with an easy efficient configuration.
[0224] And since the ink jet head 421 was arranged in two trains by point symmetry, the supply pipe 478 which supplies the regurgitation of the filter-element ingredient 13 can be packed to near the head unit 420, and assembly, maintenance control, etc. of equipment can be performed easily. Furthermore, wiring of the electric wiring 442 for controlling the ink jet head 421 can consist of both sides of the head unit 420, the effect of the electric noise by electric wiring can be prevented, and good and stabilized drawing can be obtained.
[0225] Furthermore, since two or more ink jet heads 421 were arranged in the end side of the strip-of-paper-like printed circuit board 435 and the connector 441 was formed in the other end

side, while being able to arrange without a connector 441 interfering even if it arranges on two or more straight lines and a miniaturization being possible, the array of the nozzle 466 which the location where the nozzle 466 in a main scanning direction does not exist is not formed, and continued can be acquired, and it is not necessary to use the special ink jet head of straight side.
[0226] And since it arranged by point symmetry so that a connector 441 might be located in the opposite side, the effect of the electric noise in connector 441 part can be prevented, and good and stabilized drawing can be obtained.
[0227] In addition, if the operation effectiveness in the gestalt of these operations has the same configuration with the gestalt of the above-mentioned implementation, it will do so the same operation effectiveness of corresponding.
[0228] (Gestalt of the operation about the manufacture approach of the electro-optic device using an EL element) Next, the manufacture approach of the electro-optic device of this invention is explained with reference to a drawing. In addition, the display of the active-matrix mold using EL display device as an electro-optic device is explained. In addition, the configuration of the display manufactured is explained in advance of explanation of the manufacture approach of this display.
[0229] [Configuration of a display] Drawing 35 is the circuit diagram showing some organic electroluminescence equipments in the manufacturing installation of the electro-optic device of this invention. Drawing 36 is the expansion top view showing the planar structure of the pixel field of a display.
[0230] That is, in drawing 35, 501 is the display of the active-matrix mold using EL display device which is organic electroluminescence equipment, and this display 501 has the configuration with which two or more scanning lines 503, two or more signal lines 504 prolonged in the direction which crosses to these scanning lines 503, and two or more common feeders 505 which extend in these signal lines 504 at juxtaposition were wired on the display substrate 502 of the transparence which is a substrate, respectively. And pixel field 501A is prepared in each intersection of the scanning line 503 and a signal line 504.
[0231] To the signal line 504, the shift register, the level shifter, the video line, and the data side drive circuit 507 with an analog switch are formed. Moreover, to the scanning line 503, the scan side drive circuit 508 with a shift register and a level shifter is formed. And the switching thin film transistor 509 by which a scan signal is supplied to each of pixel field 501A through the scanning line 503 at a gate electrode, The storage capacitance cap which accumulates and holds the picture signal supplied from a signal line 504 through this switching thin film transistor 509, The current thin film transistor 510 by which the picture signal held with this storage capacitance cap is supplied to a gate electrode, The light emitting device 513 put between the pixel electrode 511 with which a drive current flows in from the common feeder 505 when it connects with the common feeder 505 electrically through this current thin film transistor 510, and this pixel electrode 511 and a reflector 512 is formed.
[0232] If the scanning line 503 drives and the switching thin film transistor 509 turns on by this configuration, the potential of the signal line 504 at that time will be held at storage capacitance cap. According to the condition of this storage capacitance cap, the on-off condition of the current thin film transistor 510 is decided. And through the channel of the current thin film transistor 510, a current flows from the common feeder 505 to the pixel electrode 511, and a current flows to a reflector 512 through a light emitting device 513 further. By this, a light emitting device 513 emits light according to the amount of currents which flows this.
[0233] Here, as shown in drawing 36 which is an expansion top view in the condition of having removed the reflector 512 and the light emitting device 513, as for pixel field 501A, the flat-surface condition serves as arrangement by which four sides of the rectangular pixel electrode 511 were surrounded with a signal line 504, the common feeder 505, the scanning line 503, and the scanning line 503 for other pixel electrode 511 that is not illustrated.
[0234] [Production process of an indicating equipment] Next, the procedure of the production process which manufactures the indicating equipment of the active-matrix mold using the above-mentioned EL display device is explained. Drawing 37 thru/or drawing 39 are the

production process sectional views showing the procedure of the production process of the display of an active-matrix mold which used EL display device.
[0235] (Pretreatment) it is first shown in drawing 37 (A) -- as -- the display substrate 502 of transparence -- receiving -- the need -- responding -- a tetra-ethoxy silane (tetraethoxysilane:TEOS), oxygen gas, etc. -- material gas -- carrying out -- plasma CVD (Chemical Vapor Deposition) -- a thickness dimension forms the substrate protective coat which is the silicon oxide which is about 2000-5000A and which is not illustrated by law. Next, the temperature of the display substrate 502 is set as about 350 degrees C, and semi-conductor film 520a which is the amorphous silicon film whose thickness dimension is about 300-700A is formed in the front face of a substrate protective coat by the plasma-CVD method. Then, to semi-conductor film 520a, crystallization processes, such as laser annealing or a solid phase grown method, are carried out, and semi-conductor film 520a is crystallized on the polish recon film. Here, by the laser annealing method, output reinforcement is about 200 mJ/cm2 using the Rhine beam whose long ** of a beam is about 400nm, for example in excimer laser. About the Rhine beam, the Rhine beam is scanned so that the part equivalent to about 90% of the peak value of the laser reinforcement in the short ****** may lap for every field.
[0236] And as shown in drawing 37 (B), patterning of the semi-conductor film 520a is carried out, and island-like semi-conductor film 520b is formed. Gate-dielectric-film 521a which is the silicon oxide or the nitride whose thickness dimension is about 600-1500A is formed in the front face of the display substrate 502 in which this semi-conductor film 520b was prepared by the plasma-CVD method by making TEOS, oxygen gas, etc. into material gas. In addition, although semi-conductor film 520b becomes the channel field of the current thin film transistor 510, and a source drain field, the semi-conductor film which serves as a channel field of the switching thin film transistor 509 and a source drain field in a different cross-section location and which is not illustrated is also formed. That is, although two kinds of switching thin film transistors 509 and the current thin film transistor 510 are formed in coincidence in the production process shown in drawing 37 thru/or drawing 39, since it is formed in the same procedure, by the following explanation, only the current thin film transistor 510 is explained and explanation is omitted about the switching thin film transistor 509.
[0237] Then, as shown in drawing 37 (C), after forming the electric conduction film which is metal membranes, such as aluminum, a tantalum, molybdenum, titanium, and a tungsten, by the spatter, patterning is carried out, and gate electrode 510A shown also in drawing 36 is formed. In this condition, the phosphorus ion of high temperature is driven in and the source drain fields 510a and 510b are formed in semi-conductor film 520b in self align to gate electrode 510A. In addition, the part into which an impurity was not introduced is set to channel field 510c.
[0238] Next, as shown in drawing 37 (D), after forming an interlayer insulation film 522, a contact hole 523,524 is formed, and the junction electrode 526,527 is embedded and formed in these contact holes 523,524.
[0239] Furthermore, as shown in drawing 37 (E), a signal line 504, the common feeder 505, and the scanning line 503 (not shown in drawing 37) are formed on an interlayer insulation film 522. It forms thickly enough, without catching each wiring of a signal line 504, the common feeder 505, and the scanning line 503 by the thickness dimension required as wiring at this time. Specifically, it is good to form each wiring in the thickness dimension of about 1-2 micrometers. Here, the junction electrode 527 and each wiring may be formed at the same process. At this time, the junction electrode 526 is formed with the ITO film mentioned later.
[0240] And an interlayer insulation film 530 is formed so that the top face of each wiring may be covered, and a contact hole 532 is formed in the location corresponding to the junction electrode 526. The ITO film is formed so that the inside of this contact hole 532 may be filled, patterning of this ITO film is carried out, and the pixel electrode 511 electrically connected to source drain field 510a is formed in the predetermined location surrounded by a signal line 504, the common feeder 505, and the scanning line 503.
[0241] Here, in drawing 37 (E), the part pinched by the signal line 504 and the common feeder 505 is equivalent to the predetermined location where an optical material is arranged alternatively. And between the predetermined location and its perimeter, a level difference 535 is

formed of a signal line 504 or the common feeder 505. The predetermined location is lower than the perimeter, and, specifically, the concave level difference 535 is formed.
[0242] (Regurgitation of EL luminescent material) Next, the regurgitation of the EL luminescent material which is a functional liquefied object is carried out to the display substrate 502 with which above-mentioned pretreatment was carried out with an ink jet method. Namely, as shown in drawing 38 (A), where the top face of the display substrate 502 with which pretreatment was carried out is turned up Optical material 540A which is the solution-like precursor melted by the solvent as a functional liquefied object for forming hole-injection layer 513A equivalent to the lower layer part of a light emitting device 140 It applies alternatively in an ink jet method, i.e., the field of the predetermined location surrounded with discharge and a level difference 535 using the equipment of the gestalt of each operation mentioned above.
[0243] As optical material 540A for forming this hole-injection layer 513A that carries out the regurgitation, a polyphenylene vinylene [whose polymer precursor is polytetrahydro thiophenyl phenylene], 1, and 1-screw-(4-N and N-ditolylamino phenyl) cyclohexane, tris (8-hydroxy quinolinol) aluminum, etc. are used.
[0244] In addition, although it is going to spread in the direction of a flat surface since the fluidity is high like the case where optical material 540A of a liquefied object with a fluidity carries out the regurgitation of the filter-element ingredient 13 to the septum of the gestalt of each operation mentioned above, in the case of this regurgitation Since the level difference 535 is formed so that the applied location may be surrounded, if discharge quantity per time of optical material 540A is not made extremely extensive, it is prevented that optical material 540A spreads on the outside of a predetermined location exceeding a level difference 535.
[0245] And as shown in drawing 38 (B), the solvent of liquefied optical material 540A is evaporated by heating or optical exposure, and solid thin hole-injection layer 513A is formed on the pixel electrode 511. As shown in the count repeat of the need, and drawing 38 (C), hole-injection layer 513A of sufficient thickness dimension is formed for this drawing 38 (A) and (B).
[0246] Next, as shown in drawing 39 (A), where the top face of the display substrate 502 is turned upwards Optical material 540B which is the organic solution-like fluorescence ingredient melted by the solvent as a functional liquefied object for forming organic-semiconductor film 513B in a part for the management of a light emitting device 513 It applies alternatively using the equipment of the gestalt of each operation mentioned above in the field which is an ink jet method, i.e., the predetermined location surrounded with the level difference 535 in discharge and this. In addition, spreading on the outside of a predetermined location exceeding a level difference 535 about this optical material 540B as well as the regurgitation of optical material 540A, as mentioned above is prevented.
[0247] As optical material 540B for forming this organic-semiconductor film 513B that carries out the regurgitation Cyano polyphenylene vinylene, polyphenylene vinylene, the poly alkyl phenylene, 2, 3, 6, a 7-tetrahydro-11-oxo--1 H.5 H.11H(1) pen ZOBIRANO [6, 7, 8-ij]-kino lysine-10-carboxylic acid, A 1 and 1-screw-(4-N and N-ditolylamino phenyl) cyclohexane, 2-13 and 4'-dihydroxy phenyl - 3, 5, 7-trihydroxy 1-benzo pyrylium perchlorate, tris (8-hydroxy quinolinol) aluminum, 2, and 3, 6, and 7-tetrahydro-9-methyl-11-oxo--- a -1 H.5 H.11H(1) benzo PIRANO [6, 7, 8-ij]-kino lysine -- An aroma tick diamine derivative (TDP), an oxy-diazole dimer (OXD), An oxy-diazole derivative (PBD), a JISUCHIRU arylene derivative (DSA), A quinolinol system metal complex, a beryllium benzo quinolinol complex (Bebq), A triphenylamine derivative (MTDATA), a JISUCHIRIRU derivative, a pyrazoline dimer, Rubrene, Quinacridone, a triazole derivative, polyphenylene, the poly alkyl fluorene, the poly alkyl thiophene, an azomethine zinc complex, the Pori Hui Lynne zinc complex, a benzo oxazole zinc complex, a phenanthroline europium complex, etc. are used.
[0248] Next, as shown in drawing 39 (B), by heating or optical exposure, the solvent of optical material 540B is evaporated and solid thin organic-semiconductor film 513B is formed on hole-injection layer 513A. As shown in the count repeat of the need, and drawing 39 (C), organic-semiconductor film 513B of sufficient thickness dimension is formed for this drawing 39 (A) and (B). A light emitting device 513 is constituted by hole-injection layer 513A and organic-semiconductor film 513B. Finally, as shown in drawing 39 (D), a reflector 512 is formed the shape

of the whole front face or a stripe of the display substrate 502, and a display 501 is manufactured.
[0249] Also in the gestalt of operation shown in this drawing 35 thru/or drawing 39, the same operation effectiveness is enjoyable by carrying out the same ink jet method as the gestalt of each operation mentioned above. Furthermore, in case a functional liquefied object is applied alternatively, it can prevent that they flow into a perimeter and patterning of it can be carried out with high precision.
[0250] In addition, in the gestalt of operation of this drawing 35 thru/or drawing 39, although the display of the active-matrix mold using EL display device bearing color display in mind was explained, as shown, for example in drawing 40, even if it applies the configuration shown in drawing 35 thru/or drawing 39 to the display of monochromatic specification, it can do.
[0251] That is, organic-semiconductor film 513B may be uniformly formed all over the display substrate 502. However, even in this case, in order to prevent a cross talk, since hole-injection layer 513A must arrange alternatively for every orientation everywhere, spreading using a level difference 111 is very effective [A]. In addition, in this drawing 40, the same sign is attached about the same configuration as the gestalt of operation shown in drawing 35 thru/or drawing 39.

[0252] Moreover, as an indicating equipment using EL display device, it can do also as an indicating equipment of a passive matrix type as shown not only in an active-matrix mold but in drawing 41. Drawing 41 is EL equipment in the manufacturing installation of the electro-optic device of this invention, drawing 41 (A) is the top view showing the arrangement relation between two or more 1st bus wiring 550, two or more 2nd bus wiring 560 arranged in the direction which intersects perpendicularly with this, and **, and drawing 41 (B) is the B-B line sectional view of ** (A). In this drawing 41, the explanation which gives the same sign to the same configuration as the gestalt of operation shown in drawing 35 thru/or drawing 39, and overlaps it is omitted. Moreover, since a fine production process etc. is the same as that of the gestalt of operation shown in drawing 35 thru/or drawing 39, the illustration and explanation are omitted.
[0253] The insulator layers 570, such as SiO2, are arranged and, thereby, the display of the gestalt of operation shown in this drawing 41 forms a level difference 535 between a predetermined location and its perimeter so that the predetermined location where a light emitting device 513 is arranged may be surrounded. For this reason, in case a functional liquefied object is applied alternatively, it can prevent that they flow into a perimeter and patterning of it can be carried out with high precision.
[0254] Furthermore, as a display of an active-matrix mold, it is not restricted to the configuration of the gestalt of operation shown in drawing 35 thru/or drawing 39. That is, anything of configurations, such as a configuration as shown, for example in drawing 42, a configuration as shown in drawing 43, a configuration as shown in drawing 44, a configuration as shown in drawing 45, or a configuration as shown in drawing 45, is made.
[0255] The display shown in drawing 42 can be made to carry out patterning by forming a level difference 535 using the pixel electrode 511 with high precision. Drawing 42 is a sectional view in the phase in the middle of the production process which manufactures a display, and since the phase before and behind that is the same as that of the gestalt of the operation shown in above-mentioned drawing 35 thru/or drawing 39, and abbreviation, the illustration and explanation are omitted.
[0256] In the display shown in this drawing 42, the pixel electrode 511 is formed more thickly than usual, and this forms the level difference 535 that perimeter and in between. That is, in the display shown in this drawing 42, the convex type level difference to which the direction of the pixel electrode 511 with which an optical material is applied behind is higher than that perimeter is formed. And optical material 540A which is a precursor for forming hole-injection layer 513A equivalent to the lower layer part of a light emitting device 513 with an ink jet method like the gestalt of operation shown in above-mentioned drawing 35 thru/or drawing 39 is applied to the top face of discharge and the pixel electrode 511.
[0257] However, unlike the case of the gestalt of operation shown in above-mentioned drawing

35 thru/or drawing 39, it is in the condition which made the display substrate 502 vertical reverse, i.e., the condition which turned caudad the top face of the pixel electrode 511 with which optical material 540A is applied, and optical material 540A is breathed out and applied. By this, the top face (it is an inferior surface of tongue in drawing 41) of the pixel electrode 511 is covered with optical material 540A with gravity and surface tension, and it does not spread in that perimeter. Therefore, if it solidifies by heating, optical exposure, etc., the same thin hole-injection layer 513A as drawing 38 (B) can be formed, and if this is repeated, hole-injection layer 513A will be formed. Organic-semiconductor film 513B is also formed by the same technique. For this reason, patterning can be carried out with high precision using a convex type level difference. In addition, the amount of optical materials 540A and 540B may be adjusted using inertial force, such as gravity and not only surface tension but a centrifugal force.

[0258] The indicating equipment shown in drawing 43 is also an indicating equipment of an active-matrix mold. Drawing 43 is a sectional view in the phase in the middle of the production process which manufactures a display, and is the same as that of the gestalt of operation shown in drawing 35 thru/or drawing 39 in the phase before and behind this, and that illustration and explanation are omitted.

[0259] In the display shown in this drawing 43, first, a reflector 512 is formed on the display substrate 502, an insulator layer 570 is formed so that the predetermined location where a light emitting device 513 is behind arranged on this reflector 512 may be surrounded, and the concave level difference 535 to which the direction of a predetermined location is lower than that perimeter by this is formed.

[0260] And a light emitting device 513 is formed by breathing out alternatively the optical materials 540A and 540B which are functional liquefied objects with an ink jet method, and applying in the field surrounded with the level difference 535, like the gestalt of operation shown in above-mentioned drawing 35 thru/or drawing 39.

[0261] On the other hand, the scanning line 503, a signal line 504, the pixel electrode 511, the switching thin film transistor 509, the current thin film transistor 510, and an interlayer insulation film 530 are formed through stratum disjunctum 581 on the substrate 580 for exfoliation. Finally, the structure where it exfoliated from the stratum disjunctum 581 on the substrate 580 for exfoliation on the display substrate 502 is imprinted.

[0262] With the gestalt of operation of this drawing 43, mitigation of the damage by spreading formation of the optical materials 540A and 540B to the scanning line 503, a signal line 504, the pixel electrode 511, the switching thin film transistor 509, the current thin film transistor 510, and an interlayer insulation film 530 can be aimed at. In addition, it is applicable also to the display device of a passive matrix type.

[0263] The indicating equipment shown in drawing 44 is also an indicating equipment of an active-matrix mold. Drawing 44 is a sectional view in the phase in the middle of the production process which manufactures a display, and is the same as that of the gestalt of operation shown in drawing 35 thru/or drawing 39 in the phase before and behind this, and that illustration and explanation are omitted.

[0264] In the display shown in this drawing 44, the concave level difference 535 is formed using an interlayer insulation film 530. For this reason, without a new process increasing especially, an interlayer insulation film 530 can be used and large complication of a production process etc. can be prevented. In addition, while forming an interlayer insulation film 530 by SiO2, plasma, such as ultraviolet rays, and O2, CF3, Ar, etc. is irradiated on the front face, the front face of the pixel electrode 511 is exposed after that, and the liquefied optical materials 540A and 540B may be breathed out alternatively, and may be applied. Of this, liquid repellance strong distribution is formed along the front face of an interlayer insulation film 530, and a predetermined location becomes easy to be covered with optical materials 540A and 540B according to an operation of both a level difference 535 and the interlayer insulation film 530 with liquid repellance.

[0265] When the display shown in drawing 45 strengthens relatively the hydrophilic property of the predetermined location where the optical materials 540A and 540B which are liquefied objects are applied rather than the hydrophilic property of the perimeter, it is made for the applied optical materials 540A and 540B not to spread around. Drawing 45 is a sectional view in

the phase in the middle of the production process which manufactures a display, and is the same as that of the gestalt of operation shown in drawing 35 thru/or drawing 39 in the phase before and behind this, and that illustration and explanation are omitted.
[0266] In the display shown in this drawing 45, after forming an interlayer insulation film 530, the amorphous silicon layer 590 is formed in that top face. Since the amorphous silicon layer 590 has more relatively [than ITO which forms the pixel electrode 511] strong water repellence, distribution of a strong ******** and hydrophilic property is formed here more relatively [the hydrophilic property of the front face of the pixel electrode 511] than the hydrophilic property of the perimeter. And like the gestalt of operation shown in above-mentioned drawing 35 thru/or drawing 39, by breathing out alternatively the liquefied optical materials 540A and 540B with an ink jet method, and applying towards the top face of the pixel electrode 511, a light emitting device 513 is formed and, finally a reflector 512 is formed.
[0267] In addition, it is applicable to the display device of a passive matrix type also about the gestalt of operation shown in this drawing 45. Furthermore, the process which imprints the structure formed through stratum disjunctum 581 on the substrate 580 for exfoliation to the display substrate 502 like the gestalt of operation shown in drawing 43 may be included.
[0268] And distribution of water repellence and a hydrophilic property may be formed with insulator layers, such as a metal, and an oxide film on anode, polyimide or silicon oxide, and other ingredients. In addition, if it is the display device of a passive matrix type, as long as it is the display device of the 1st bus wiring 550 and an active-matrix mold, you may form by the scanning line 503, the signal line 504, the pixel electrode 511, the insulator layer 530, or protection-from-light layer 6b.
[0269] The display shown in drawing 46 does not raise patterning precision using a level difference 535, liquid repellance and lyophilic distribution, etc., and improvement in patterning precision is aimed at using attraction, repulsive force, etc. by potential. Drawing 45 is a sectional view in the phase in the middle of the production process which manufactures a display, and is the same as that of the gestalt of operation shown in drawing 35 thru/or drawing 39 in the phase before and behind this, and that illustration and explanation are omitted.
[0270] In the display shown in this drawing 46, while driving a signal line 504 and the common feeder 505, the potential distribution to which the pixel electrode 511 serves as minus potential, and an interlayer insulation film 530 serves as plus potential is formed by turning on and off suitably the transistor which is not illustrated. And with an ink jet method, liquefied optical material 540A charged in plus is alternatively breathed out in a predetermined location, and spreading formation is carried out. By this, since optical material 540A is electrified, not only spontaneous polarization but an electrification charge can be used, and the precision of patterning can be improved further.
[0271] In addition, it is applicable to the display device of a passive matrix type also about the gestalt of operation shown in this drawing 46. Furthermore, the process which imprints the structure formed through stratum disjunctum 581 on the substrate 580 for exfoliation to the display substrate 502 like the gestalt of operation shown in drawing 43 may be included.
[0272] Moreover, since potential is not given to the pixel electrode 511, plus potential is given only to an interlayer insulation film 530 and liquefied optical material 540A is electrified in plus as it is not limited to this and shown in drawing 47 for example, you may make it apply, although potential is given to both the pixel electrode 511 and the interlayer insulation film 530 of the perimeter. According to the configuration shown in this drawing 47, also after being applied, since liquefied optical material 540A can maintain the condition of having been certainly charged in plus, it can prevent more certainly that liquefied optical material 540A flows into a perimeter according to the repulsive force between the surrounding interlayer insulation films 530.
[0273] (Gestalt of other operations) Although the gestalt of desirable operation was mentioned and this invention was explained above, this invention is not limited to the gestalt of each above-mentioned implementation, also including deformation as shown below, is the range which can attain the purpose of this invention, and can be set as which other concrete structures and configurations.
[0274] That is, for example, by the manufacturing installation of the color filter shown in drawing

8 and drawing 9, although it decided to carry out vertical scanning of the mother substrate 12 by the ink jet head 22 by moving the ink jet head 22 to a main scanning direction X, carrying out horizontal scanning of the mother substrate 12, and moving the mother substrate 12 with the vertical-scanning driving gear 21, contrary to this, horizontal scanning can be performed by migration of the mother substrate 12, and vertical scanning can also be performed by migration of the ink jet head 22. Furthermore, it can consider moving the mother substrate 12, without moving the ink jet head 22, or moving both sides to hard flow relatively etc. as which configuration which is made to move either relatively at least and the ink jet head 22 moves relatively along the front face of the mother substrate 12.

[0275] Moreover, although the ink jet head 421 of the structure which carries out the regurgitation of the ink using bending deformation of a piezoelectric device was used with the gestalt of the above-mentioned implementation, the ink jet head of the structure of other arbitration, for example, the ink jet head of the method which carries out the regurgitation of the ink by the bubble generated with heating etc., can also be used.

[0276] Furthermore, in the gestalt of operation shown in drawing 22 thru/or drawing 32, although it is on an abbreviation straight line at intervals of abbreviation etc. and 2 successive-installation **** explanation of the nozzle 466 was given as an ink jet head 421, they are not only two trains but two or more articles. Moreover, need to make a train and it is not necessary for you not to be **** spacing and to arrange it on a straight line.

[0277] That and drop regurgitation equipment 16,401 is used for manufacture It is not what is limited to a color filter 1, liquid crystal equipment 101, and EL equipment 201. Electron emission equipments, such as FED (Field Emission Display: field emission display), PDP (Plasma Display Panel: plasma display panel), The ink which is a functional liquefied object containing an electrophoresis apparatus, i.e., a charged particle, to the crevice between the septa of each pixel Discharge, The equipment which impresses an electrical potential difference to inter-electrode [which is arranged so that each pixel may be pinched up and down], brings near a charged particle by one electrode side, and gives an indication by each pixel, The thin Braun tube, a CRT (Cathode-Ray Tube: cathode-ray tube) display, etc. can be used for various electro-optic devices which have a substrate (base material) and have the process which forms a predetermined layer in the upper field.

[0278] Equipment and the approach of this invention are a device which has a substrate (base material) containing an electro-optic device, and can be used in the production process of various devices which can use the process which carries out the regurgitation of the drop to the base material. In order to form the electric wiring of a printed circuit board, for example, a liquefied metal and a conductive ingredient, The configuration which breathes out a metal content coating etc. by the ink jet method, and carries out metal wiring etc., The configuration which forms an optical member in the regurgitation according the detailed micro lens formed on a base material to an ink jet method, The configuration which carries out the regurgitation by the ink jet method so that the resist applied on a substrate may be applied only to a required part, Like the configuration which carries out regurgitation formation of the heights which scatter light over translucency substrates, such as plastics, etc., the minute white pattern, etc. by the ink jet method, and forms a light-scattering plate, and reagent test equipment Make the spike spot which carries out a matrix array on a DNA (deoxyribonucleic acid: deoxyribonucleic acid) chip breathe out RNA (ribonucleic acid: ribonucleic acid) by the ink jet method, and a fluorescent-labeling probe is produced. Carrying out high BURITAZESHON on a DNA chip etc. in the location of the shape of a dot divided by the base material It can use for the configuration which is made to breathe out a sample, an antibody, DNA (deoxyribonucleic acid: deoxyribonucleic acid), etc. by the ink jet method, and forms a biochip.

[0279] Moreover, the active-matrix liquid crystal panel which equipped the pixel with transistors, such as TFT, or the active component of TFD also as liquid crystal equipment 101, The thing of a configuration so that ink may be breathed out to the crevice which forms the septum 6 which encloses a pixel electrode and is formed by this septum 6 by the ink jet method and a color filter 1 may be formed in it,